THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 34 MARCH, 1934 No. 6

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No. 24

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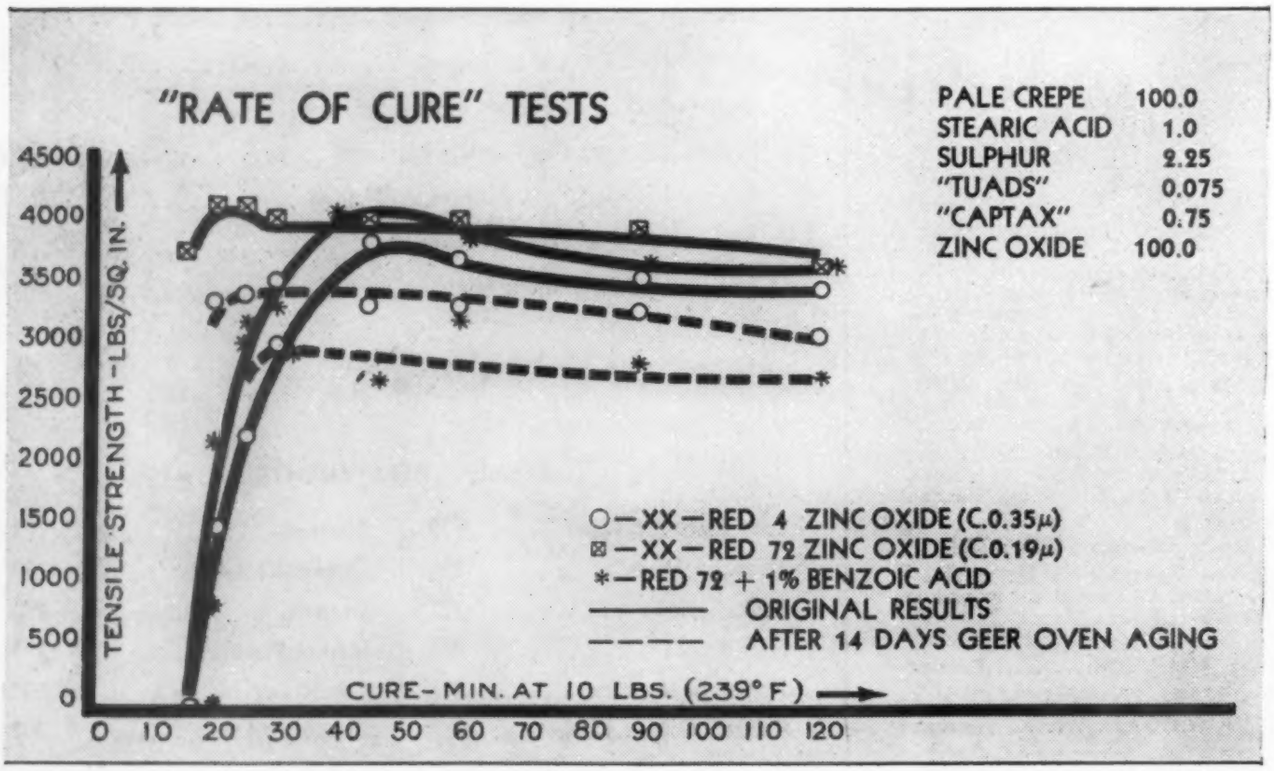

THE NEW JERSEY ZINC COMPANY 160 FRONT STREET NEW YORK

THE RUBBER AGE

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LASTEX Takes an Important Place Among Apparel Fabrics

Unique Qualities of This Rubber-Cored Yarn Make It Valuable in Numerous Applications

DURING the past three years there has grown up within the rubber industry an entirely new field of manufacture whose sales have already mounted well into the millions of dollars. Despite the fact that it is the development of a single company, it has literally expanded into an industry within an industry and still possesses possibilities that may be conservatively described as tremendous.

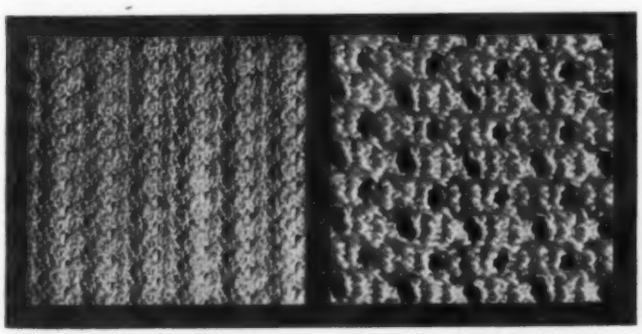
Textile authorities term Lastex, the "miracle yarn" of the United States Rubber Company, the most successful innovation in that field since artificial silk. Its use has spread from women's corsets and garterless socks to practically every item of wearing apparel. Leading manufacturers are embodying it in products that range from hats to shoes and from pajamas to bathing suits.

Lastex is an elastic yarn formed from a core of spun-rubber thread, covered with silk, cotton, wool, linen or rayon, and capable of being woven or knitted in a knitting machine. The rubber core, termed Lactron by the company, is produced by the Hopkinson and Gibbons method

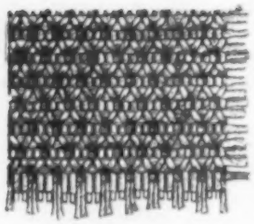
Magic Yarn
Lastex permits ease of movement, as illustrated in the Smoothies of the Strouse, Adler Co.

(U. S. Patent No. 1,545,257) by forcing thick, creamed latex through openings which may be as small as 1/500 of an inch, although 1/200 is fine enough for most commercial purposes. The resulting filament is then wrapped with the desired yarn by right and left helical windings of small and either alike or different pitch, the relative pitch of the windings being selected with due consideration to the size and nature of the materials being wound in order to obtain an approximately balanced elastic yarn, relatively free from a tendency to kink (Adamson Patent, U. S. No. 1,822,847). For most purposes, the core should be of a thickness between .0133 and .0080 of an inch, in its normal or relaxed condition, but both larger and smaller cores may be used.

With the increasing employment of Lastex in the textile industry, production and sales have naturally risen and an appreciable quantity of the liquid latex imported into this country now goes into the manufacture of this yarn. Sales are reported to have been 32,000 pounds in 1931, 500,000 pounds in 1932, and 1,200,000 pounds in 1933. Percy Adamson, of Adamson Brothers Company, sole distributors



Typical of Latex fabrics are these samples of Beauray, developed by the Ideal Linen Mesh Company and offered in continuous lengths with widths up to 58 inches



The stop-thread, lockstitch construction of the Youthlastic fabric

of Lastex yarns for the United States Rubber Company, estimates that 1934 sales may reach 2,000,000 pounds. Inasmuch as Lastex is sold at an average price above $3 a pound, its 1933 sales volume must have exceeded $3,600,000.

The major quality of Lastex is, of course, its resiliency, and the yarn, truly woven or knitted into any material, will stretch up and down as well as sideways, providing the widely advertised "two-way stretch." The first commercial use of Lastex was in men's socks. A Lastex top employed by the Holeproof Hosiery Company eliminated the necessity for garters through its own inherent gripping properties. Since that time the Bike Web Manufacturing Company has brought out its Bike Lastex sanitary socks with an ankle support of Lastex, the Brown Durrell Company has introduced its Gordon Ne-Flex stocking with Lastex yarn knitted into the welt, Bauer & Black have developed elastic surgical stockings made completely of Lastex, and many other hosiery manufacturers have taken advantage of its possibilities.

But an even more important field was soon found in women's corsets and other foundation garments. Kops Brothers, Inc., added a Lastex corset under the name of the "Sensation" to its line of Nemo-Flex foundation garments in the fall of 1931, and now about half of that company's business is done in its Lastex lines. Today practically all the leading makers of corsets, girdles, brassieres and similar garments use Lastex in at least part of their lines. The Lastex foundation garment achieved popularity because it yields with every motion of the body while at the same time having sufficient tension to exercise adequate figure control. It can also be washed in hot or cold water and ironed without impairing its qualities.

Two-Way Stretch
Free body movement is possible with a Lastex foundation garment. This is Le Gant, a Warner Brothers Company corset made of Youthlastic fabric

Lastex also quickly found its place in underwear, particularly at the waist and knee, where it provides a close, smooth fit. The Lastex can be knitted into the garment itself, thus doing away with any seaming. It was discovered that a bathing suit made with Lastex will not lose its shape, wet or dry, and will not shrink or sag. Its elasticity gives the wearer a freedom of motion and the sensation of swimming with no suit at all, but it also has enough tension to provide a certain amount of figure control.

These four major uses—hosiery, corsets, underwear, bathing suits—represent perhaps 80 per cent of all Lastex production. In addition, however, applications of the "magic thread" have extended to headgear and footwear, men's suits and women's dresses, riding breeches, gloves, neckties and children's clothes.

In the millinery field, the advantage of a fabric that will enable a hat to contract or expand to conform to the size and shape of the wearer's head is obvious. This means that women can wear the same hat regardless of the style in which their hair is dressed, and it makes it possible for merchants to cut down considerably on head sizes carried in stock. The same principle has been applied to men's caps, resulting in a headpiece that is completely comfortable at all times.

A few of the numerous articles of apparel in which Lastex is used

New comfort is given to women's shoes by this material. A section of Lastex inserted at the top of the instep ends the possibility of pumps pinching and cutting at this point. Besides the welcome ease, the use of Lastex also means that the pump stays on the foot more securely and develops no unsightly gaps. Beach clogs also employ Lastex to good advantage. The fabric part that goes over the toes is so combined with this yarn that the clogs cling to the foot and make walking much more comfortable.

What is true of hats and shoes is equally true of gloves. Women's gloves with the resilient, finger-conforming fit of leather may be fashioned from the same fabric as the wearer's frock through the addition of Lastex. This also means, of course, the possibility of perfect fit with far fewer sizes carried in stock.

When Lastex is used in the making of outer garments, the necessity for alterations is appreciably reduced. A woman will find a dress of her size a perfect fit regardless of the fact that her shoulders may be narrow or her hips large. Lastex creates the perfect clothes for active sports use, for the wearer may partake of the most vigorous exercise without restraint. Lastex knitted garments never sag or bag. There is always a snug fit at the purled waistline and cuffs, while pleats hold their original shape and do not become undone. Woven fabrics have the give and take of knitted with the resultant ease of fit and comfort, but with no fear of losing their shape.

The principal maker of Lastex suits for men is H. Daroff & Sons, Inc., who introduced a line of such suits last year under the name of Darson "Living Clothes." The same advantages mentioned in connection with women's clothes apply to these suits. The Lastex-containing suit will hold its shape indefinitely, and the creases in trousers and coat do not require such constant attention as in ordinary garments.

Men's sport clothes are given new flexibility by Lastex.

In Hosiery

The Gordon Ne-Flex Stocking has Lastex yarn knitted into the welt

By knitting the yarn into the ribbed bands that finish windbreakers and sweaters at the waistline and wrists, a snug fit is assured at all times without the least binding. The same advantage is to be found in its use in riding breeches and golf knickers.

Lastex performs the same service for children's underwear and outer garments that it does for those of adults. In particular, it makes possible the production of children's undergarments without the use of buttons or strings. Lastex makes pajamas fit securely without cramping, and its qualities also make it adaptable for men's shirts. In the field of accessories, it has been found to make women's handbags that keep their shape and are easily washable. New applications for Lastex yarn are continually being found, and some will undoubtedly be developed that will add appreciably to the quantity of the material now being produced and sold.

Lastex Molds the Feminine Form

. . . and, at the same time, yields with every motion of the body. Illustrated above are the Tu-Way garments of the Royal Worcester Corset Company at the left and the Sensation of Kops Bros., Inc., at the right

Naturally the proportion of Lastex in each of these different articles of apparel varies greatly, and the percentage of actual rubber latex is sometimes very small. In the average Lastex yarn there may be only 30 per cent rubber thread and 70 per cent of the covering fibrous material. In the garments themselves, the amount of Lastex may range from only 5 per cent in a man's suit to from 50 to 75 per cent in corsets and other foundation garments. The Lastex bathing suit may contain from 8 to 25 per cent Lastex, depending on the knitting stitch.

Gall-Proof High-Temperature Thread Dope

OF INTEREST to heavy duty machinery manufacturers and users is a new metallic lead thread lubricant, claimed to be of value in the assembling of machinery and in the repair of equipment subjected to heavy duty, high temperatures and general abuse.

The makers describe the product as being a very finely divided metallic lead in paste form, and claim that in use a film of metallic lead is formed between the threads that prevents galling, speeds up repair work, and cuts costs. Stud bolts on the heads and exhaust manifolds will not freeze, nor will pipe threads corrode together, regardless of time, as the lead does not oxidize or harden.

Used on liners and flywheels, it facilitates their insertion or removal. All press work is improved by the use of this lubricant. Even a bright red heat does not harden or destroy the compound in the threads, making it a satisfactory dope for exhaust studs. (Armite Laboratories, 1900 East 65th Street, Los Angeles, Cal.)

A Comparison of Oxygen Bomb, Geer Oven and Air Bomb Tests

Laboratory Aging Tests by These Three Methods Are Found to Produce Largely Similar Results

By E. W. BOOTH
Rubber Service Laboratories Company

Because of the length of time necessary to carry out the Geer oven aging tests, the possibility of using the air-bomb aging test instead was investigated. A large number of comparisons in gum stocks were made between experimental and commercial materials in oxygen-bomb, Geer oven, and air-bomb aging tests. Without exception the results of tests showed that the Geer oven and air-bomb age tests gave similar results, and that antioxidants which gave satisfactory results in the air-bomb aging tests likewise gave satisfactory results in Geer-oven aging test. Further experimenting must be done to include tread stocks in the air-bomb aging tests.

RUBBER manufacturers in the majority of their products are required to meet specified aging tests. All rubber testing laboratories likewise utilize some aging test in investigating and studying rubber compounding and rubber chemicals. In the laboratory, rubber aging tests are carried out most commonly by employing the Bierer-Davis oxygen bomb and the Geer oven. Both of these tests have become substantially standardized and have been employed for a number of years. Such an amount of data has been accumulated from these tests and correlated with natural aging results that reasonable predictions are possible as to the serviceable life of a given stock. The oxygen bomb aging test is increasingly losing favor as a reliable test to predict the natural aging of vulcanized stocks. This is particularly the case when such specifications are employed as those commonly recommended, namely: 300 pounds oxygen pressure maintained for 96 hours or more at 70° C. (158° F.). A lower oxygen pressure and a longer period of time than those mentioned above is frequently employed by some laboratories, but in any event the oxygen bomb aging tests as ordinarily performed require the shortest time of any of the accelerated aging tests in general use today. Geer oven aging tests are carried out under generally accepted standard conditions by heating the vulcanized stock at 70° C (158° F) for varying periods of time, such as 3 days, 7 days or more frequently a multiple of 7 days. Geer oven aging tests frequently require 21 or 28 days and sometimes longer to determine the relative value of the stocks investigated and the actual differences between them. This time factor is, too frequently, longer than is desirable for a laboratory test.

In *Industrial & Engineering Chemistry* (Vol. 24, p. 555, 1932) the author of this paper described a procedure and recommended specifications for carrying out air bomb aging tests particularly for investigating heat resisting tube stocks. The specifications recommended in that paper were as follows: regular dumb bell strips were maintained under 50 percent elongation at a temperature of 121° C. (250° F.) and 100 pounds air pressure and the modulus and tensile values of the stocks were determined before and after aging. Specifications such as these naturally limit the type of stocks that can be compared satisfactorily in the air bomb. The author has found that such experimental conditions cannot be followed in testing tread stocks in which case the temperature and air pressure specified must be reduced and possibly also the elongation. Experiments have been carried out under these altered conditions and the conclusions from this study will be presented in a future paper.

In some recent publications,* questions have been raised concerning the reliability and value to the manufacturer or consumer of rubber goods, of tests in which the experimental conditions are so exaggerated over the conditions of actual service. The oxygen bomb, the Geer oven and more recently the air bomb tests have been subjected to this criticism. However, when it is considered that the rubber compounder does not expect a laboratory test to take the place of an actual service test, but desires only to compare an experimental stock with a known standard or control stock, the value of which in a service test is known, it is believed that an accelerated aging test is valuable and reasonably reliable. The primary purpose of accelerated laboratory aging tests is to avoid the necessity of actual service tests which require too much time and money to make on all experimental stocks. The value of any aging test is to compare an unknown with a known stock under similar conditions, and certainly this can be accomplished satisfactorily by accelerated tests.

Tests Help Develop Inner Tube Stock

The results of tests and comparisons made in the air bomb have proved of considerable help in developing a heat resisting inner tube stock for use in truck and bus tires, and this fact alone should justify the use of the air bomb in laboratory testing. It is believed that such a test ultimately will be adopted by practically all rubber testing laboratories.

That there is a difference in the results obtained from the oxygen bomb and Geer oven age tests as shown by the Scott testing machine has been known for a long time. But the relationship between the air bomb and the Geer oven or oxygen bomb testing methods has never been shown to the

This paper is a condensed version of a discussion presented by Mr. Booth, together with R. L. Shipley, before the Rubber Division, A.C.S., at Chicago, Ill., on September 12, 1933.

* *Rubber Chemistry & Technology*, Vol. 6, 157 (1933), by Charles Dufraisse.

writer's knowledge. It is the object of this paper to correlate such testing methods so far as possible.

As mentioned above, preliminary tests carried out in our laboratory have shown that tread stocks can not be compared in the air bomb using the specifications previously mentioned, since the deterioration of the stocks take place too rapidly to permit reliable comparisons. Preliminary tests also have shown that some anti-oxidants have a tendency to migrate to an appreciable extent in the oxygen bomb and to a somewhat lesser degree in the Geer oven and air bomb age tests. Therefore, in the stocks shown hereinafter there was never more than one anti-oxidant present in the different stocks in the bomb at any one time and wherever any anti-oxidant was present, it was included in all of the stocks under test at the same time. When the stocks shown are designated as containing no anti-oxidant, all of the stocks under test in the oxygen bomb, Geer oven or air bomb at the time of that test had no anti-oxidant present, and likewise when 1 percent or 2 percent of a given anti-oxidant is designated, the given anti-oxidant only was present in all of the stocks tested at that time.

As stated previously, the usual dumb bell strips of the type employed on the Scott testing machine are used in air bomb aging tests. On the other hand, in both the Geer oven and the oxygen bomb aging tests, it is our practice to age one-half of a press cured sheet from which, after aging, the dumb bell strips are died out. The test stocks in both the Geer oven and the oxygen bomb were suspended from hooks and were at least one inch apart during the test while the stocks in the air bomb tests were separated from one another under elongation in a rack.

We have made a large number of tests including oxygen bomb, Geer oven and air bomb aging tests on the same stocks, comparing a large number of anti-oxidants and accelerators, both experimental materials and commercial products. We have selected for the present study, commercial anti-oxidants and accelerators which are well known. Although the stocks shown in this paper are gum stocks, we have used the same anti-oxidants in tread stocks and by means of Geer oven and oxygen bomb age tests have proved to our satisfaction that the anti-oxidants are comparable in both tread and gum stocks.

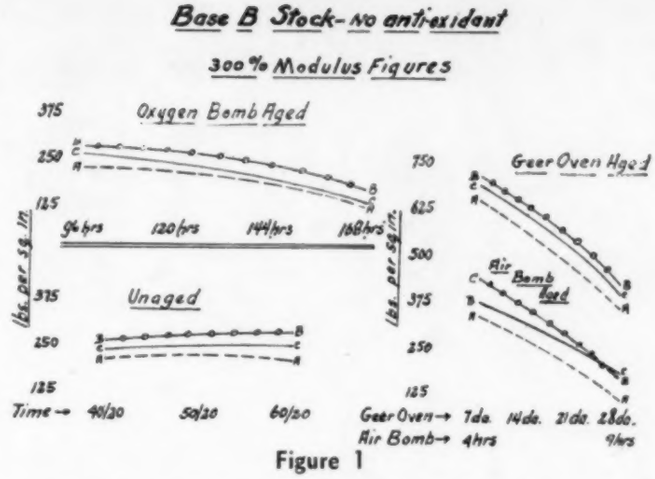


Figure 1

The first base stock chosen for this comparison of oxygen bomb, air bomb and Geer oven study was as follows:

Pale Crepe	100.
Zinc Oxide	5.0
Sulfur	3.0
Stearic Acid	0.5

To this base stock were added various accelerators and anti-oxidants. Various lengths of time and various temperatures were employed in curing. The test results using this base stock are not set forth for the reason that they showed nothing differing essentially from the results obtained with the base A stock.

Table No. 1 shows the results obtained with the base A stock which is as follows

Pale Crepe	100.
Zinc Oxide	8.
Sulfur	2.5
Stearic Acid	0.5

To this base stock were added the various accelerators

TABLE NO. 1—BASE A STOCK

					No Antioxidant			Antioxidant—1%			Antioxidant—2%		
					Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb
			300%	220	....	180	92	298	286	112	292	296	118
			500%	540	....	540	294	723	1110	322	720	1130	352
A	Mercapto—Benzo—Thiazole	0.75	700%	2050	....	....	....	....	....	1252	....	....	1360
			Break	3250	195	980	720	1335	1725	1590	1435	1875	1568
			Elong	770	180	560	655	615	560	750	630	565	750
			300%	306	....	330	208	442	364	196	395	394	209
			500%	940	....	....	546	....	1230	704	....	1360	722
B	Butyl—Aldehyde—Amine (808)	0.50	700%	4070	....	....	....	....	....	1735	....	....	1720
			Break	4450	210	664	1335	725	1860	2230	895	2175	2420
			Elong	730	180	470	655	445	535	750	490	560	765
			300%	247	....	190	87	335	274	123	312	316	111
	Benzo-thiazyl—Thio-benzoate	0.60	500%	602	....	556	288	740	1068	344	710	1245	342
C	DPG	0.15	700%	2295	....	....	....	....	....	1186	....	....	1272
			Break	3430	120	890	860	1495	1870	1565	1560	1825	1510
		0.75	Elong	785	170	550	675	630	560	745	640	550	740
			300%	260	....	306	153	598	390	179	374	422	194
	Benzo-thiazyl	0.45	500%	700	....	....	420	1302	1184	568	994	1174	609
D	Thio-benzoate—DPG Phthalate	0.30	700%	2960	....	....	....	....	....	1412	....	....	1480
			Break	4100	220	854	654	1425	1670	1810	1455	1915	1950
		0.75	Elong	760	185	490	540	515	555	735	530	560	735
			300%	310	....	325	183	453	360	188	398	408	200
			500%	952	....	....	524	....	1284	684	....	1324	685
E	Butyl—Aldehyde—Amine (A-32)	0.50	700%	4165	....	....	....	....	....	1690	....	....	1710
			Break	4420	280	628	1365	678	1925	2125	955	2135	2340
			Elong	720	225	460	660	430	540	755	495	545	755
			300%	264	....	....	205	355	314	211	224	332	226
			500%	800	....	....	652	....	946	720	915	1087	746
F	2-4 dinitro Phenyl-thio—Benzo-thiazole Mixture with DPG	0.50	700%	3465	....	....	....	....	....	1970	....	....	2030
			Break	4200	110	111	1320	692	1510	2470	915	1755	2360
			Elong	735	110	110	640	445	555	755	500	565	740

TABLE NO. 2—BASE B STOCK

					No Antioxidant			2% Modified Acetone Aniline Reaction Product			2% Diphenyl Amine Acetone Reaction Product			2% Phenyl-beta-naphthylamine		
				Unaged	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb
A	Mercapto—Benzo—Thiazole 1.50	300%		238	110	365	179	258	675	172	237	455	154	233	442	162
		500%		705	....	1210	612	894	2695	552	857	1530	537	846	1473	542
		700%		2440	....	....	1720	....	....	1810	....	....	1690	....	....	1720
		Break		3160	326	1355	1980	1580	3715	1810	1760	2385	1690	1435	2110	1720
		Elong		755	380	510	725	580	550	700	555	560	700	540	550	700
B	Benzo-Thiazyl—Thio-benzoate ... 1.20	300%		295	156	438	204	329	655	216	297	492	165	284	467	184
		500%		822	....	1520	654	1085	2745	632	935	1836	608	922	1724	628
	DPG 0.30	700%		3010	....	....	2080	....	....	....	....	....	....	....	....	....
		Break		3555	410	1520	2080	1595	3795	2125	1455	2560	1840	1022	2045	1875
	1.50	Elong		735	360	500	700	555	545	685	540	555	665	510	535	660
C	Benzo-Thiazyl—Thio-benzoate ... 0.56	300%		278	202	419	195	254	595	163	265	422	143	250	403	148
		500%		820	....	1425	592	930	2505	542	913	1502	520	903	1428	528
	DPG 0.69	700%		3020	....	....	1855	....	....	1700	....	....	1520	....	....	1590
		Break		3755	320	1465	1855	1445	3495	1700	1580	2670	1520	1245	2280	1615
	1.25	Elong		765	310	505	700	560	550	700	570	570	700	525	555	705

designated. The anti-oxidant used in this stock was a diphenylamine-acetone product which is similar in its action to the other anti-oxidants designated in base B stock. Since Table No. 1 only includes an aging study of different accelerators and since a direct comparison of several anti-oxidants is shown later, such data is not included in the following tables to avoid undue length to this paper.

Table No. 1 gives a summary of the results obtained with base A stock. The 60 minute cure at 20 pounds steam pressure (125° C. or 258° F.) is shown, and only one aging time for air bomb, Geer oven and oxygen bomb is given. The advantage of adding an anti-oxidant is clearly shown.

Table No. 2 shows the results obtained with the base B stock which is as follows:

Pale Crepe	100.
Zinc Oxide	8.
Sulfur	2.
Stearic Acid	0.5

To this base stock were added the accelerators and anti-oxidants specified. The time of cure chosen here is 45 minutes at 20 pounds steam pressure (125° C or 258° F.). Here again a summary only is given. The same times of aging are shown here as are shown in Table No. 1 and therefore a comparison can be made of the relative values of the two base stocks.

Base A and B stocks show an excellent range of cure for all of the accelerators. The modulus and tensile figures are typical of the accelerators tested.

All of the data, irrespective of the accelerator employed and whether or not an anti-oxidant is used, show that Geer oven and air bomb aging markedly increase the modulus for the shorter aging periods, but that later the stocks soften quite rapidly (i. e. the modulus figures decrease rapidly). On the other hand oxygen bomb age tests show only a slight initial increase in modulus and a gradual softening in longer aging periods. The use of an anti-oxidant only increases the length of time necessary to reduce the tensiles to the end point of the tests, such as 1000 pounds or less, and tends to decrease the rapid softening produced by the Geer oven and air bomb aging. The base A stock would probably be classified as a tire carcass or inner tube stock, and the base B stock would be classified as an inner tube stock, or if a smaller amount of accelerator were used, as a typical truck tire carcass stock.

We have used this base B stock for a large number of comparisons of experimental anti-oxidants with highly satisfactory results. We have observed, however, that while 50 pounds steam pressure cures (148° C. or 298° F.) can often be used when testing anti-oxidants or accelerators with this base stock, that the results are not accurate comparisons, due to the fact that over or under cured stocks are frequently magnified due to the rather large amounts of accelerators shown.

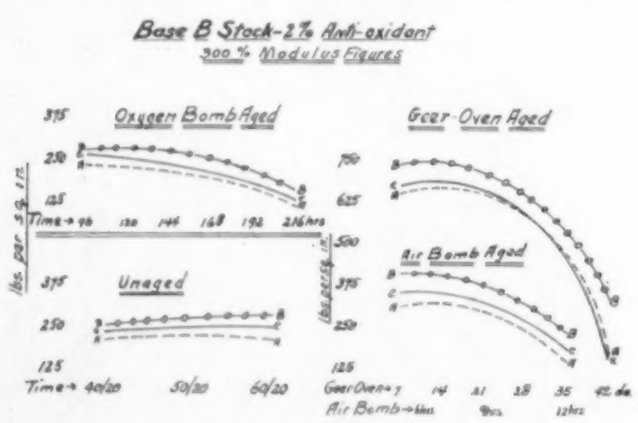

Base B Stock-2% Anti-oxidant
300% Modulus Figures
Oxygen Bomb Aged
Geer Oven Aged
Air Bomb Aged
Unaged
Time→ 96 120 144 168 192 216 hrs
Time→ 40/20 50/20 60/20
Geer Oven→ 7 14 21 28 35 42 da
Air Bomb→ 6hrs 9hrs 12hrs

Figure 2

TABLE NO. 3—BASE C STOCK

				No Antioxidant			2% Antioxidant		
			Unaged	Aged 9 hrs. in Air Bomb	Aged 21 days in Geer Oven	Aged 168 hrs. in Oxygen Bomb	Age 24 hrs. in Air Bomb	Aged 35 days in Geer Oven	Aged 192 hrs. in Oxygen Bomb
A	Mercapto—Benzo—Thiazole ... 2.0	300%	464	523	612	270	441	591	369
		500%	1325	1335	1610	823	1365	1613	1172
		700%	3320	....	....	....	....	....	....
		Break	3890	1590	2075	1715	1865	1820	1880
		Elong	715	520	570	565	540	560	540
B	Benzo-thiazyl, Thio-benzoate 1.60	300%	484	547	628	315	457	614	364
		500%	1448	1460	1628	867	1392	1635	1191
	DPG 0.40	700%	3450	....	....	....	....	....	....
		Break	3960	1620	2470	1750	1920	1820	1925
	2.00	Elong	720	515	590	545	540	550	545
C	Benzo-thiazyl, Thio-benzoate 2.00	300%	548	623	720	425	585	733	494
		500%	1521	1783	1924	1142	1510	1865	1327
	DPG Phthalate 0.80	700%	3845	....	....	....	....	....	....
		Break	4515	2220	2875	2090	2090	2260	2215
	2.80	Elong	725	530	560	630	550	515	445

Table No. 3 shows the results obtained using the base C stock which is as follows

Smoked Sheets	100.
P-33 Black	40.
Zinc Oxide	5.
Sulfur	0.8
Stearic Acid ..	1.0

To this base stock were added the accelerators specified and an anti-oxidant again of the diphenylamine-acetone type. The 50 minute cure at 20 pounds steam pressure (125° C. to 258° F.) is shown.

The foregoing tests were carried out with a so called "heat resisting" inner tube or "super aging" stock. While the aging period required to reduce the tensiles to 1000 pounds or less is longer with base C stock than with either base A or B stocks, nevertheless the same relationship exists between the oxygen bomb, air bomb and Geer oven aged tests.

With all three stocks, there are two principal differences between the base A, B and C stocks, namely the sulfur and accelerator ratios. There have been several papers published showing that the free or combined sulfur has no effect on the aging properties (oxidation) of cured rubber. This would leave only the increased amounts of accelerator to account for the better aging properties exhibited by the B and C base stocks. However, it is the writer's opinion that the data set forth in this paper show that the lower sulfur ratios employed in the base B and C stocks markedly improve the Geer oven and air bomb aging results but do not so markedly improve the oxygen bomb aging results.

Curves are given which were plotted from the data obtained using the base B and C stocks. Because of the short length of time necessary to bring about changes in modulus in air bomb aging tests, no curves are shown for the base A stock.

The following are some general conclusions drawn from the data obtained in the above tests.

1. Irrespective of the base stock employed and the accelerator used and whether no anti-oxidant or 1 percent or two percent of an anti-oxidant was used, the air bomb and Geer oven aging results show initially a marked increase in modulus and, on longer aging, a rapid decrease in modulus of the aged stocks. The oxygen bomb aging results on the other hand show initially a slight increase in modulus followed by a gradual decrease in modulus on longer aging periods.

2. Under the experimental conditions employed, anti-oxidants improve a rubber stock more when aged in the Geer oven and air bomb than when aged in the oxygen bomb.

3. No attempt has been made to show that any definite period of aging in the air bomb is equivalent to a specified time of aging in the Geer oven. However, from the deterioration taking place in the stocks reported it is quite evident that a relationship exists. Thus, for example, 9 hours in the air bomb is approximately equivalent to 35 days in the Geer oven in the case of the base B stock where

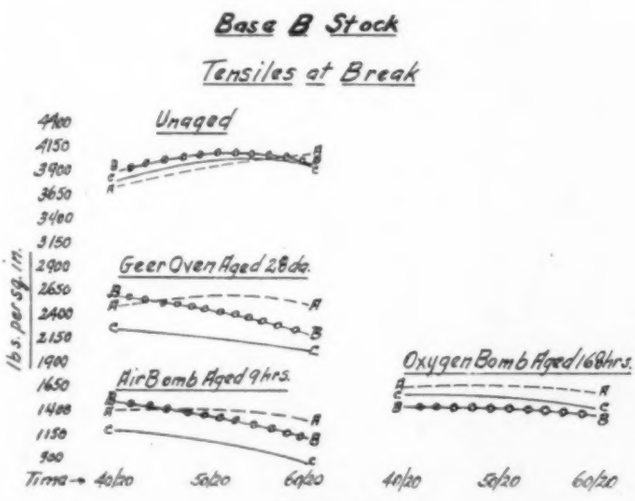

Base B Stock
Tensiles at Break
Unaged
Geer Oven Aged 28 da.
Air Bomb Aged 9 hrs.
Oxygen Bomb Aged 168 hrs.
lbs. per sq. in.
Time → 40/20 50/20 60/20 40/20 50/20 60/20

Figure 3

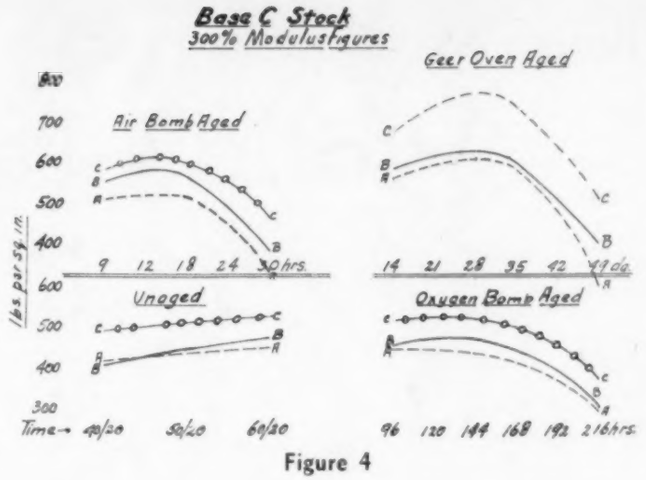

Base C Stock
300% Modulus figures
Geer Oven Aged
Air Bomb Aged
Unaged
Oxygen Bomb Aged
lbs. per sq. in.
Time → 40/20 50/20 60/20 96 120 144 168 192 216 hrs.

Figure 4

2 percent anti-oxidant is used, and also is approximately equivalent to 192 hours in the oxygen bomb for this same stock.

4. Without exception, tests employing experimental materials as anti-oxidants have shown when using the base B stock that an anti-oxidant effective in a 9 hour air bomb aging test is also equally effective in a 28 day Geer oven age test, both when used in a gum stock or in a tread stock. Furthermore, we have found no exception to the conclusion that when an experimental anti-oxidant was unsatisfactory for the required period in an air bomb age test, it was also unsatisfactory in a Geer oven age test.

5. It is the firm opinion of the writer that the air bomb can be used in place of the Geer oven in laboratory testing and comparison of commercial or experimental products as anti-oxidants. It is however suggested that a gum stock with 2 percent anti-oxidant be used, and corrections made for the acceleration or retarding of the anti-oxidant, if necessary. The base B stock is suggested in place of the base A stock for the reason that the base A stock deteriorates too rapidly while in the case of the base C stock containing a large amount of accelerator and a high P-33 black content, it is difficult to detect slight acceleration or retardation of the anti-oxidant under test.

Rubber and Tar Combinations

AN INTERESTING field of application for chlorinated rubber is suggested by its ability to form homogeneous combinations with coal tar, exhibiting a relatively high drop-point. According to A. Nielson, a market might thus be found for grades of tar of unduly low softening points. The stability and resistance to most chemical reagents which distinguishes modern commercial chlorinated rubber is attained after the maximum theoretical amount of chlorine (65 per cent) has entered the rubber molecule. Lower chlorinated products are defective either in physical or chemical resistance.

Sponge Rubber

AS the milling of crude rubber for sponge rubber is increased, the shrinkage from the dimensions of the mold, in which sponge is made from this crude rubber, decreases. Also long protracted milling causes a certain amount of deterioration in the quality of the finished sponge rubber. A small amount of ground-cured scrap added to the sponge rubber compound materially reduces this dimensional shrinkage. This permits the production of sponge rubber with less milling and so maintains a higher standard of quality.—*R. R. Olin Laboratories, Akron, O.*

British Manufacturer Installs

World's Largest Press

for Belting and Mat Production

Huge Hydraulic Vulcanizing Machine Has a Load Capacity of 10,000 Tons

By OLIVER P. VAN STEEVEN

WHAT is said to be the world's largest rubber belt and mat vulcanizing press has recently been installed and put into operation at the plant of the India Rubber, Gutta Percha & Telegraph Works Company, Ltd., Silvertown, London, England. Inasmuch as it has a load capacity of 10,000 tons and has heating platens with a working surface 31 ft. 4 in. long by 8 ft. 4⅜ in. wide, there would appear to be little question as to its claim to be the largest of its type. The full length of the press is 42 ft. 7 in., its greatest width 13 ft. 1½ in. and its height 12 ft. 1½ in.

The entire machine is constructed of open-hearth cast steel and forged steel, no cast iron being employed. The total weight of the press is 260 tons. The press table of cast steel is in one piece and is carried on twelve rams arranged in pairs at each of the six bottom beams which are connected to the top casting by means of twelve heavy columns fitted with split nuts having a locking device. The top casting is in sections so assembled that it is virtually a single piece so far as the transmission of pressure is concerned. Longitudinal movement due to expansion and contraction from the alternate heating and cooling of the press is duly provided for, the bottom beams being carried on rollers.

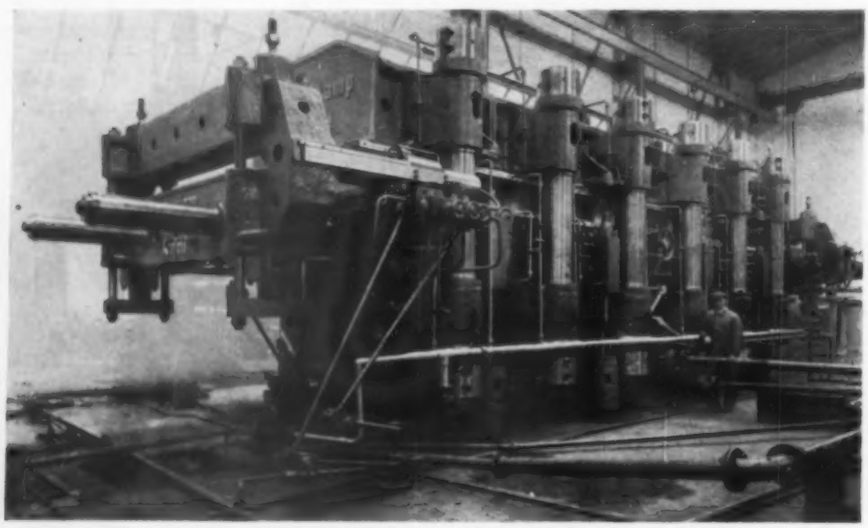
Hydraulically operated clamping and stretching gear, to keep the material taut when belting is being treated, is fitted at each end of the press. The press is further fitted with levelling devices permitting adjustment within a fraction of a millimeter without dismantling so as to compensate for distortion from possible subsidence of the foundations. Care has also been taken to prevent the press table from warping on account of the one-sided heating.

The platens are made of the finest quality steel and are ground and polished brightly on the contacting surfaces. The hot plates are subdivided into ten heating sections. Each section can be regulated separately and is fitted with a number of thermometers. The greatest guarantee is, therefore, given for an even heating and cooling of the whole plate.

Oblique drilling has been avoided, so as to utilize the whole heating surface and avoid dead corners. The heating channels have stopping plugs of special design, which take up readily the changes due to alternate heating and cooling so that no leakage is possible. The plugs are not driven in by force, but can be undone and replaced easily. It is, therefore, easy to clean the passages of scale or other foreign matter.

Heat is conveyed to the top hot plate from the top crossbeam. The other steam supply and exhaust pipes lead downwards, and in no way interfere with the accessibility of the press. The ends of the hot plates are fitted with specially designed cooling sections. A special device has been fitted to prevent any air getting enclosed during the cure or when closing the press. The sleeve can be changed in an exceptionally short time, without dismantling any parts.

The columns are made of forged open-hearth steel and fitted with split nuts made by a special process, so that any loosening while the machine is at work is prevented. Special care has been taken to render all press water connections to the cylinders easily accessible.

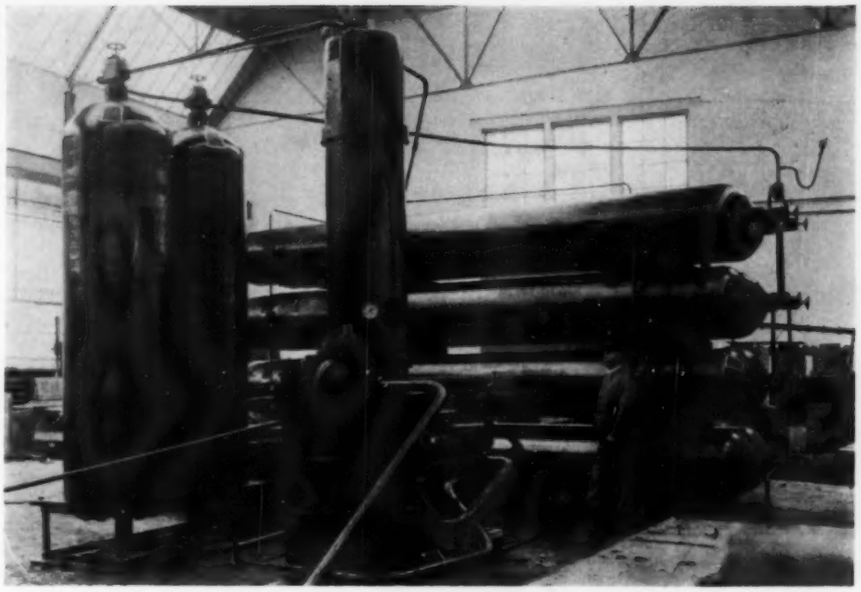


New Giant Press

The operating side of the great machine which is 42 feet, 7 inches in length and weighs 260 tons

The Accumulator Plant

The accumulator for operating the press is pistonless, air-loaded, with effective capacity of about 280 gallons.



The clamping and stretching devices necessary for the manufacture of belts are fitted with convex and concave surfaces so that the belt may be tightly gripped, yet without undue pressure which would leave marks. The clamping cylinders are underneath, so that no water leaking out will reach the belt. Clamping and stretching plungers have outside packings, which can be easily replaced.

A well-tested feature is the hydraulically actuated automatic side-pressure device, which insures that the setting rulers act automatically and evenly, and avoids having to rearrange the edge-forming bars after each cure. In addition, this device prevents any damage being done to the polished surfaces of the hot plates by the collapsing setting irons of the opening of the press.

For the manufacture of mats two special brightly polished feed-plates are provided, movable to the right and left. These feed-plates run on ball bearing rollers and are easily moved about. A special device prevents their sticking after the vulcanizing process is finished.

The guiding principle in the design of the press is high efficiency, together with economy of pressure water. The working process may be divided into four parts:

(1) The press is closed by two double-cylinders only, while water is flowing into the other eight cylinders from an elevated supply tank. Closing time is about ten seconds.

(2) With medium pressure all 12 cylinders receive low-pressure water at 1,650 lb. pressure. The water consumption of low-pressure water is very small, since there remains only a small part of the stroke to be done.

(3) With high pressure, the low-pressure water of 1,650 lb. is run into a pressure-transformer, which increases the working-pressure to any figure between 1,650 and 4,500 lbs. The pressure-transformer is completely automatic, and no special attention need be paid to its regulation.

(4) The return is by eight return cylinders, designed for the full stroke of the press, which greatly accelerate the opening of the press. The return movements of the press take a few seconds only. The speeds stated for the closing and the opening of the press show that the governing gear and the pipe connections have been amply dimensioned.

The connecting piping is arranged in such a way that there is only a single link joint for the steam and one for the hydraulic piping, so that the number of packings necessary for movable parts is reduced to a minimum.

The press has been tested in all its details and the condition that the limit of error in the thickness of the belts when ready should not exceed .004 in. either way was strictly fulfilled.

The accumulator for operating the press is pistonless, air-loaded, with effective capacity of about 280 gal., consisting of a driving accumulator, two water containers and eight air containers. The space required is very small. By designing compressed-air accumulators without pistons and ground cylinders, damage is avoided, since these will become scored in use in spite of careful attention. Nor are there any interior packings in this kind of accumulator. The efficiency of piston accumulators is lowered by the friction of the piston, while in the pistonless type the efficiency amounts to 100 per cent. A great advantage of the pistonless compressed air accumulator is that it can be enlarged at any time when desired without stopping the plant. The cost of such additions is small. The design of the pistonless accumulator is simple and absolutely reliable. All parts subject to wear and tear are easily accessible, and can be replaced without discharging water or even air from the accumulator.

The pistonless compressed-air accumulator is fitted with an automatic starting and stopping device for the pump, switching the pump off to no-load when the accumulator is filled, and switching it on again after a certain amount of water has been drawn off from the accumulator. In the same way any sinking of the water-level below its minimum is prevented. A certain amount of water must have accumulated before water for use is at disposal. A minimum content of the accumulator is, therefore, guaranteed —a feature that is very important for certain processes which, once started, must be completed lest the material be spoiled. This safety device against overloading and no-load running is very simple, no auxiliary electrical apparatus being necessary.

The eight air-containers, each 27½ in. diameter and about 19 ft. 8 in. long, are fitted on the bottom with flanges water-sealed against the air-pressure, so that the inner walls may be inspected and repainted. Any collection of water can be got rid of in the simplest way.

The whole plant is fitted with the most modern automatic recording instruments for water pressure and temperatures. A large number of patents owned by the firm G. Siempelkamp and Co., Krefeld, Germany, have been applied in the manufacture of the press.

Extension on Trade Practice Report

Announcement was made early this month that an extra 30 days has been granted for the filing of a code authority report on trade practices in the tire manufacturing industry for President Roosevelt and NRA officials. The code authority was under injunction from President Roosevelt to file a report on sales and production practices 90 days after the signing of the code. With the 30-day extension this will not be required until April 20.

New Equipment

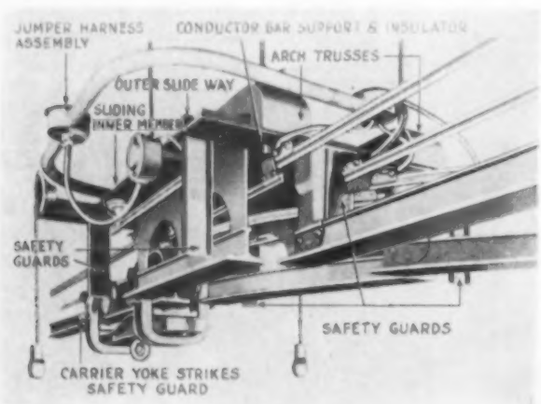
Dielectric Strength Test Set

THE Sound Engineering Corp., 416 Leavitt Street, Chicago, Ill., has just introduced its new Model 1-IE Dielectric Strength Test Set for testing the insulating value of sheet materials such as rubber, paper, cloth, var-

nished cambrics, mica and other insulating materials. Means are also provided for testing complete units such as insulated wire, coils, transformers, etc. According to the company, there has been no device heretofore able to make such tests of dielectric strength with laboratory accuracy, convenience and safety. The unit is completely self-contained in a strong all-metal case, finished in black crystal baked enamel.

Cleveland Tramrail Type "D" Switch

TO THEIR line of overhead materials handling equipment, the Cleveland Tramrail Division of the Cleveland Crane and Engineering Company, Wickliffe, Ohio, have added what is known as Type "D" Switch, suitable



for all types of Cleveland Tramrail hand propelled carriers and for certain types of electrically operated carriers, but more compact and permitting a closer switch grouping and rail spacing than is possible with their standard sliding type switch.

This switch is built of rolled steel members rigidly welded together. It consists of two main parts, a rigid outer frame and a sliding inner member fitted and guided so as to maintain the proper alignment of the switch and incoming rails at all times. The inner member incorporates a top plate providing a cover for the slide-way as a protection against dust, dirt and the elements. Fittings for lubrication of the slide-way are provided. Safety guides welded to the switch frame prevent the carrier from being accidentally or deliberately run off the rail, regardless of the position of the switch or the carrier. The Type "D" switch can be electrified at any time by the simple addition of the proper electrical conductors and conductor bar supports.

Higher Alcohols in Rubber Compounding

WHILE the commercial production of higher aliphatic alcohols (together with their sulphonated forms) by means of catalytic high pressure hydrogenation had been accomplished in Germany about 1927 to 1928, it is only during the past two years that attention has been widely focussed on this general subject on this side of the Atlantic, according to William B. Wiegand, director of research, Binney & Smith Company, writing in the February issue of *Canadian Chemistry and Metallurgy*.

It has lately been claimed, in fact, that one of these preparations of higher aliphatic alcohols assists greatly in the dispersion of carbon black in rubber, functioning not only as a dispersing agent but as a powerful plasticizer, inhibitor of sun-cracking and bad aging, and cure activator to the extent of one-third when used in carbon black mixings. These are formidable claims deserving of the attention of all rubber technologists, particularly because up to the present time there has been a conspicuous absence of materials capable of enhancing dispersion without at the same time breaking down the rubber substance and, therefore, its physical properties.

Experiments were, therefore, carried out in order to determine definitely the broader properties of these new substances, particularly from the point of view of carbon black compounding in tread type mixings. Dr. Wiegand gives the results of these experiments in the following recapitulation:

1. The higher alcohols are entirely without the cure activating action displayed by fatty acids. They do not dissolve and therefore make available the zinc oxide which is particularly essential in the case of mercapto-carbon black tread mixings. The higher alcohols are therefore under no circumstances to be regarded as a substitute for stearic acid. On the other hand they do not retard cure.
2. There are some indications that the higher alcohols improve the dispersion of carbon black in rubber. In the case of laboratory mixings these differences were not of sufficient magnitude to be reflected in the stress strain curve.
3. Their softening action is greater than that of stearic acid but less than that, for example, of Pine Tar.
4. Their softening action is not accompanied by cure retardation and by general degradation of physical properties, after cure, which characterize the free use of Pine Tar.
5. The inclusion of up to 2% of the rubber of the higher fatty alcohols with proportionate reduction in Pine Tar improves curing and physical properties, apparently without loss in consistency of raw stock.
6. At their present high cost, it seems questionable whether these improvements are economically advantageous.

THE best statistical section in any rubber journal in the world is published in every issue of THE RUBBER AGE. *Consult it regularly to keep posted on the statistical position of every branch of the rubber industry.*

Rubber Chemists Hold Spring Meetings

Rubber Division, A.C.S., to Convene at St. Petersburg; A.S.T.M. Committees Hold Sessions at Atlantic City

MEMBERS of the Rubber Division of the American Chemical Society will hold their Spring meeting at St. Petersburg, Fla., in connection with the Society's Eighty-Seventh meeting during the week of March 25 to 30. The sessions for the Rubber Division will be conducted on the mornings of Wednesday, March 28, and Thursday, March 29, with three technical papers to be presented at each session.

The meetings of the rubber chemists will be held at the Soreno Hotel, and, on the evening of Wednesday, March 28, there will be a joint dinner with members of the Paint and Varnish Division. H. G. Bimmerman, of E. I. du Pont de Nemours & Company, will act as chairman of the entertainment committee.

The three technical papers to be presented during the first morning session are, in effect, a continuation of the symposium on the progress of chemistry in the rubber industry which was started during the Fall, 1933, meeting at Chicago. Abstracts of the other three papers are presented below, together with other details of the meeting and the scheduled time of presentation of all papers:

DIVISION OF RUBBER CHEMISTRY

IRA WILLIAMS, *Chairman;* H. E. SIMMONS, *Secretary-Treasurer;* C. W. CHRISTENSEN, *Sergeant-at-Arms*

Meetings to Be Held in the Soreno Hotel

WEDNESDAY MORNING—March 28

Symposium on Progress of Chemistry in the Rubber Industry

9:30—The Mechanism of the Action of Organic Accelerators in the Vulcanization of Rubber

L. B. Sebrell and Winfield Scott

10:30—The Use of Age Resistors for Retarding the Deterioration of Rubber

Waldo L. Semon

11:30—The Chemistry of Hard Rubber (Ebonite)

A. R. Kemp and F. S. Malm

WEDNESDAY EVENING—March 28

Joint Dinner of the Rubber Division with the Paint and Varnish Division

THURSDAY MORNING—March 29

9:30—The Presence of Alanine in Rubber Latex

J. McGavack and J. S. Rumbold

Serum from normal latex obtained by creaming in the usual manner was dried to a thick syrup. This was dissolved in absolute alcohol and amino acids esterified in the presence of dry hydrochloric acid. By fractionation and extraction methods crystalline material with a sharp melting point having 15.5 per cent nitrogen was obtained. This was identified as d-alanine by electrometric titration using glass electrode. The indications are that latex contains about 0.03 per cent of this substance.

9:50—Discussion

10:00—A Method for Determining Flex Cracking in Treads

Harold Gray, H. S. Karch and R. J. Hull

A method for comparing the flex cracking properties of tread stocks on standard tires which permits the use of laboratory mixed batches is presented. The method can be adapted to the testing of the effect of carcass construction, tread design, etc., on flex cracking. Comparative tests on tires of different make can also be made. Laboratory results check with information obtained from the road.

10:25—Discussion

10:35—The Relation of Volume Change to the Mechanism of Vulcanization of Rubber

Ira Williams

Rubber sulfur mixtures increase in density during vulcanization in direct proportion to the amount of sulfur combined. No change in density has been found which would indicate either an increase or decrease in the number of double bonds during vulcanization.

The reversion point of rubber during vulcanization at least in certain cases corresponds to the time of practical disappearance of accelerator.

10:55—Discussion

11:05—Business Meeting

A. S. T. M. Committee Meetings

MEMBERS of the standing committees of the American Society for Testing Materials held their spring group meetings at the Wardman Park Hotel, Washington, D. C., from March 5 to 9. Discussions of interest to rubber technologists were conducted during the sessions of Committee D-11 on Rubber Products and Committee D-13 on Textile Materials.

During the past year Committee D-11 has devoted its attention to the development of test methods for rubber products rather than sponsoring materials specifications. A method of classification and tests for the various types of power transmission belting were formulated as were also methods of tests for rubber hose, of both the wrapped and braided construction. Detailed requirements for both standard and heavy cotton braid on insulated wire and cable, changes in the cable tape sections and a number of minor changes have put the two existing specifications into excellent form and in accord with the best and most economical manufacturing practice.

With increasing uses of rubber in automobile construction, the proper tests for measuring the adhesive strength of rubber to metal has been a problem of great importance to both the rubber and automotive industries. The development of standard tests for adhesion of rubber in such applications has been undertaken by a new subcommittee.

The development in the last few years of artificial rubbers that swell less than natural rubber has created considerable interest in the preparation of compounds more resistant to swelling in oils or various solvents. A new subcommittee has been formed to develop suitable tests for volume increases of rubber in such liquids.

Valuable information on the reliability of the standard test for the stress-strain relation of rubber was given in a report on tests by 13 cooperating laboratories of a single compound with unaged specimens cured in a single laboratory.

In evaluating rubber compounds to be used in compression for the purposes of vibration absorption, the measurement of the resistance of the rubber to permanent distortion is important. This property "compression set" is being studied and methods for its determination developed.

Committee D-13 on Textile Materials has been very active in perfecting its standards and in undertaking the development of new subjects in the textile field. Work is in progress on specifications for single-yarn tire-chafer fabrics, and plans are being made for the development of a fatigue test for tire cord.

Code Authorities Are Named for the Rubber Industry

MEMBERS of the balance of the various code authorities to administer the Code of Fair Competition for the Rubber Manufacturing Industry were named during the month. Those comprising the Tire Code Authority and the Divisional Code Authorities for mechanical goods, footwear, heels and soles, flooring, hard rubber and sundries were listed in the February issue of THE RUBBER AGE. The balance of the code authority members are the following:

GENERAL RUBBER MANUFACTURING CODE AUTHORITY

Members

A. L. VILES, Chairman, Rubber Manufacturers Association, Inc.
O. C. PAHLINE, Goodyear Tire & Rubber Company
T. J. NEEDHAM, United States Rubber Company
F. D. HENDRICKSON, American Hard Rubber Company
R. E. DRAKE, Avon Sole Company
J. H. CONNORS, B. F. Goodrich Company
M. I. WOYTHALER, Hodgman Rubber Company
WILLIAM LICHTENSTEIN, Peerless Garment Company
F. T. LANE, Seamless Rubber Company
B. B. FELIX, Featheredge Rubber Company

Alternates

PAUL COSTE, United States Rubber Company
A. B. NEWHALL, Hood Rubber Products Company
BRUCE BEDFORD, Luzerne Rubber Company
H. T. MASON, Quabaug Rubber Company
H. N. YOUNG, Hamilton Rubber Manufacturing Company
A. K. DANNENBAUM, Aldan Rubber Company
MOE SHERMAN, Sherman Bros. Rainwear Company
T. W. CASEY, Seiberling Latex Products Company
G. B. DRYDEN, Dryden Rubber Company

AUTO FABRICS, PROOFING AND BACKING DIVISIONAL CODE AUTHORITY

Members

M. I. WOYTHALER, Chairman, Hodgman Rubber Company
J. T. CALLAHAN, Archer Rubber Company
H. M. FREYDBERG, Acme Backing Corporation
N. E. BOWMAN, Pocono Company
W. H. JENKS, L. C. Chase Company

Alternates

A. K. DANNENBAUM, Aldan Rubber Company
C. KENYON, JR., Vulcan Proofing Company
F. N. KITE, Windram Manufacturing Company
J. D. LIPPMAN, Textileather Corporation
N. BOYNTON, JR., Boston Woven Hose & Rubber Company

SPONGE RUBBER DIVISIONAL CODE AUTHORITY

Members

B. B. FELIX, Chairman, Featheredge Rubber Company
F. M. DALY, Sponge Rubber Products Company
L. H. CHENOWETH, B. F. Goodrich Company

Alternates

G. B. DRYDEN, Alternate Chairman, Dryden Rubber Company
R. J. LIMBERT, Lee Rubber & Tire Corporation
G. E. JEANDHEUR, Elmhurst Rubber Company

RAINWEAR DIVISIONAL CODE AUTHORITY

Members

WILLIAM LICHTENSTEIN, Peerless Garment Company
FRED MONOSSON, Cosmopolitan Manufacturing Company
MOE SHERMAN, Sherman Bros. Rainwear Company
A. D. USOW, Badger Raincoat Company
A. B. ZUCKERT, A. B. Zuckert Company
JAMES J. DRUMMEY, United States Rubber Company

Alternates

ROBERT P. CABLE, Cable Raincoat Company
SAM GOLDSTEIN, Old Colony Manufacturing Company
CHARLES PLOTTEL, Plottel Bros.
DAVID ASCH, Quality Coat Company
F. F. SOMMERS, JR., Chicago Rubber Clothing Company
MAX KOVITZ, Atlas Raincoat Manufacturing Company
GEORGE E. GOODWIN, Archer Rubber Company

Japanese Rubber Footwear Exports

ACCORDING to a statement issued by the Japan Rubber Industrial Association, the 1933 production of rubber footwear, including canvas shoes, for export amounted to 44,299,248 pairs valued at 23,486,802 yen. These figures when compared with those for the previous year show an increase in quantity of 8,692,826 pairs. This increased production, mainly in canvas shoes, is attributed to an expansion in world markets for Japanese footwear during the first half of the year. These markets showed a very marked contraction during the last half of 1933 due to the imposition of protective duties by several countries, but notwithstanding this shipments to South Africa, East Africa, New Zealand, and Manchuria increased considerably.

Exports of rubber boots amounted to 2,078,230 pairs valued at 2,178,437 yen—a decline of 920,722 pairs from the previous year but an increase in value of 1,278,752 yen. Rubber shoes, not including canvas shoes, sold in foreign markets amounted to 5,313,085 pairs, or an increase of 2,011,643 pairs, attributable to an increased demand from Manchuria. "Other" footwear declined by 1,387,041 pairs and amounted to 2,909,251 pairs. As Great Britain was the principal buyer of "other" footwear, it is possible that this falling off might be attributed to the rearrangement of her import duties. On the whole, however, exports increased by 8,692,826 pairs and in value by 9,307,434 yen. Exports of canvas shoes, which accounted for 80 per cent of the total exports, amounted to 33,998,682 pairs valued at 17,678,554 yen, and were shipped to Manchuria, China, and other Oriental markets where this particular class of footwear finds a ready sale.

The industry—that is, the rubber footwear section of it—showed at the end of 1933 indications of a coming depression as the plants in full operation decreased by 24, and those in three-quarter operation by 7, but the number operating to 60 per cent of capacity increased by 15, and those operating to 50 per cent of capacity by 14.

Varnishes Made from Rubber

VARNISHES or lacquers are prepared, under a German formula, by heating natural or artificial rubber in high-boiling hydrocarbons at 120° to 230° C., with sulfur and chloride of lime at a pressure from 1 to 15 atmospheres, with or without the additions of chlorides of the alkaline earths or metals, according to the *Solvent News* of the U. S. Industrial Alcohol Company, Inc.

Vinyl compounds, such as the chloride or acetate, which may be polymerized, may be incorporated, together with trichloracetic acid and an additional quantity of chloride of lime, omitting the other chlorides.

The addition of trichloracetic acid is particularly suitable for the vulcanization and dispersion of artificial rubber. When varnish is to be used on fabrics, paper, etc., diamyl of dibutyl phthalate may be added together with linseed or other varnishes.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

SAFEGUARDING INDUSTRY AGAINST THE PILFERING OF IDEAS. By Henry Creange. Published by George Grady Press, 445 West 41st Street, New York City. 76 pp. 1934. $1.50.

To some extent design piracy has been felt by the rubber manufacturing industry, and legislation such as the author advocates to declare this an unfair form of competition would probably be welcomed by many manufacturers. Mr. Creange, known as technical adviser to industries here and abroad, explains how one may know the "parentage" of a design and discusses the steps taken in France and other countries to protect the originators of ideas.

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NATIONAL BIAS CUTTER. Published by the National Rubber Machinery Company, Akron, O. 6 pp. 1934. For free distribution.

The development of the National bias cutter was undertaken as a solution to the unbalanced relation between bias cutting and tire building; and also to improve cutting accuracy and more precise duplication of ply widths. This machine is illustrated, and its mechanical features are described in detail. The company's skid type liner stripper and duplex liner stripper are also illustrated and described.

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THE GREAT AMERICAN GAMBLE. Published by the Travelers Insurance Company, Hartford, Conn. 56 pp. 1934. For free distribution.

During each of the past five years an average of 30,000 persons have been killed and close to 1,000,000 injured in the use of the streets and highways of the United States. Statistical data on the accidents that caused these casualies are contained in this well prepared brochure, together with appropriate illustrations and important recommendations for the improvement of these conditions.

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OPERATORS HAND BOOK. Published by the B. F. Goodrich Rubber Company, Akron, O. 40 pp. 1934. For free distribution.

The 1934 edition of this manual lists all the company's tires for trucks and buses, gives their complete specifications and describes the right tires for varied purposes. A large number of specification tables are included. Methods by which operators of trucks or buses may easily determine the tire cost per mile on each installation are described. A table giving the weight of various commodities, and a changeover guide for 1½ ton trucks are also among the features of the hand book.

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SIXTEENTH REPORT ON NATIVE RUBBER CULTIVATION. By A. Luytjes and C. J. van Bijlert. Published by the Bureau of Agricultural Economics, Buitenzorg, Java. 8 pp. 1933.

Results of the increased price for crude rubber on native output are shown in this report. Its figures and tables for production in the Netherlands East Indies are carried through the third quarter of 1933.

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THE SOLUTION OF YOUR CONDENSATION PROBLEM. Published by the Nason Manufacturing Company, 71 Fulton Street, New York City. 20 pp. 1934. For free distribution.

The problem of condensation is explained in detail, and the solution as developed by companies in various industries is presented, together with a discussion of the large savings that can be effected in many plants. The company's full line of steam traps is illustrated and described.

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ZINC OXIDES FOR EVERY PURPOSE. Booklet issued by American Zinc Sales Co., Columbus, Ohio. 28 pp.; punched for small loose leaf binder. For free distribution.

This booklet, as its title indicates, describes briefly all of the AZO brand of zinc oxides produced for various purposes and industries. In addition to detailing the recommended uses of each grade of oxide listed, valuable chemical data are given. The booklet also includes some comments on zinc oxide in general and specific facts about its use in rubber and paints. A series of photomicrographs illustrating the particle structure of six different grades of zinc oxide are also shown.

HOISTS. Published by the Harnischfeger Corporation, 4400 West National Avenue, Milwaukee, Wis. 1934. For free distribution.

The application of hoists to both general and specific problems is treated in this bulletin. Profusely illustrated in color with photographs of installations and diagrams explaining simplified construction and operation, it lists the ratings and operating ranges for various types of hoists along with specifications and electrical accessories.

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INDIVIDUAL AND COLLECTIVE BARGAINING UNDER THE N. I. R. A. Published by the National Industrial Conference Board, Inc., 247 Park Avenue, New York City. 48 pp. 1933. $1.00.

Events of the last few months have led to much questioning as to whether industrial employes generally have availed themselves of the statutory privilege conferred by Section 7 (a) of the National Industrial Recovery Act to bargain collectively with their employers through representatives of their own choosing, and, if so, what form of collective bargaining they have elected to use. In order to obtain first-hand information on this subject the National Industrial Conference Board has conducted a nation-wide survey, the results of which are set forth in this monograph.

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MANUAL FOR THE ADJUSTMENT OF COMPLAINTS: N. R. A. BULLETIN NO. 7. Published by the Superintendent of Documents, Government Printing Office, Washington, D. C. 40 pp. 1934. 5 cents.

It is the purpose of this manual to indicate the method by which complaints of violations of N. R. A. codes of fair competition will be handled by the National Recovery Administration, by state directors and by code authorities. The routing of code complaints and the adjustment of violations is fully explained.

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FALK MOTOREDUCERS: BULLETIN NO. 270. Published by the Falk Corporation, Milwaukee, Wis. 20 pp. 1934. For free distribution.

To a line already large, this corporation has added several new and important members which are described in this catalog. Speed reducers play an important part in rubber factory engineering practice, and this organization has found that many installations permit the combining of motor and speed reducer in a single unit. Such units, which are said to have the advantages of lower cost, compactness and simplified construction, are illustrated and explained in detail.

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SILICOSIS. Published by the Industrial Health Section, Metropolitan Life Insurance Company, 1 Madison Avenue, New York City. 32 pp. 1933. For free distribution.

Finely ground silica of all types is employed as a filler in rubber, hard rubber, pressed and moulded goods. Recognition of the harmfulness of silica dust to the lungs of workers and the taking of steps toward dust prevention should, therefore, be important to rubber company plant superintendents and safety directors. Suggestions in this booklet should be of distinct aid in controlling dusty processes arising in the course of manufacture.

Editorial Comment

Safety on the Highway

DURING 1933 there were about 29,900 persons killed and about 850,700 injured non-fatally in automobile accidents within the United States. As in previous years, this record resembles a list of war casualties. In the ten years from 1924 to 1933 deaths from motor vehicle accidents totaled 273,112.

Since the beginning of 1930 nearly 4,000,000 persons have suffered non-fatal injuries and nearly 125,000 have been killed in this manner. The record of automobile accident casualties for the remainder of the present decade, on the basis of the experience of the last four years, will be nearly 190,000 deaths and approximately 6,000,000 injured—a total for the decade of around 315,000 killed and 10,000,000 injured.

Thus in a ten-year period the number of people killed by automobiles would exceed America's record of soldiers killed during all the history of the country, and would surpass the fatal battle casualties of the American Expeditionary Forces in the World War more than six times. If those killed and injured were claimed as victims in a few major, big head-line catastrophes, there is little doubt that something drastic would be done. Because these casualties are spread over thousands of seemingly minor disasters, however, is no reason why action should not be taken to alleviate a situation which is desperately tragic in the aggregate.

Dead drivers will not buy tires and tubes. Beyond this patent fact, though, is always the possibility that an aroused public may sometime demand such stringent regulation of motor car operation as to restrict seriously the expansion of the automotive industry. Tire manufacturers would, therefore, be only protecting their own interests in any effort they may make for greater safety of life and limb on the country's streets and highways.

Specifically, we are told that 7,120 cars were in accidents last year because of punctures and blowouts and that 480 of these accidents resulted in fatalities. It is known from tests made of the mechanical condition of cars in a number of states that three out of every four vehicles registered are dangerous because of some defect in safety equipment. These tests show that tires are in either poor or only fair condition on nearly 48 per cent of the cars.

But the rubber industry would be selfish and nearsighted if it were to confine its efforts toward highway safety to the replacement of defective tire equipment. Together with other branches of the automotive industry, it should take an active part in any movement that will lead to the greater protection of the driver, the passenger and the pedestrian.

An interesting beginning has been made in such projects as the Silvertown Safety League, sponsored by the B. F. Goodrich Company. Awards have been presented to operators who have driven for a certain period of time without an accident for which they were responsible. But the tire manufacturing industry can profitably afford to go far beyond this start in a cooperative effort to reduce the extent of destruction that is being caused annually by motor car operation.

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Are Higher Prices Justified?

DESPITE the improvement in volume of sales, the profit outlook for the tire industry continues obscure because of the persistence of unsettlement in competitive conditions and price structure. Many manufacturers, however, are outspoken in favor of higher prices for their products and, with the cooperation possible under the industry's code, definite action toward this end may be expected.

In the Department of Labor indices of wholesale prices, practically all manufactured articles are shown to have advanced to a point well above 50 per cent of their 1926 levels. Automobile tires and tubes, however, remain at 43.2. In view of this fact and the evidence to the effect that so many companies are unable to realize adequate profit at current levels, there would seem to be ample justification for an advance in schedules to compensate at least for increased labor and raw material costs.

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Domestic Crude Rubber

WE ARE glad to voice agreement with the Akron *Beacon Journal* that the sum asked by the Department of Agriculture for rubber investigation and experimentation during the coming fiscal year is reasonable. The request is only for $60,000, which is $10,000 under the budget for the previous year.

"The work is justified," says Dr. Knowles A. Ryerson, Chief of the Bureau of Plant Survey, "as a measure of insurance in time of emergency in case our rubber supply from the East Indies ever is cut off."

With a source of native rubber, this country is very nearly self-sustaining. Admittedly, such a source of supply is probably unrealizable; yet a limited supply might conceivably be developed that would mean millions to the nation in emergency.

CURRENT • NEWS
of the Rubber Industry

MARCH, 1934

Combined Profit of Goodyear, Goodrich and U. S. Rubber Co. Amounts to $8,370,962

Compares with Losses of $17,790,908 in 1932— U. S. Profit First Since 1927 — Gains Shown By Fisk, Corduroy, Losses by Mohawk and Kelly

FINANCIAL statements for the year ended December 31, 1933, show a decided change from the general losses of the previous year, with the majority of the leading tire and rubber companies now reporting satisfactory profits. While showing a net income of only $76,913, the United States Rubber Company probably registered the best comeback in view of its 1932 loss of $10,358,374 and the fact that it has not registered a profit since 1927. Goodyear's profit of $6,021,535 compares with a net loss of $850,394 in 1932, and Goodrich's profit of $2,272,514 compares with a 1932 loss of $6,582,140.

Earlier this year profits of $2,397,059 had been reported by Firestone, $414,912 by General, $260,607 by Lee, and $183,239 by Dayton.

U. S. RUBBER

IN ADDITION to reporting its first annual profit after five consecutive years of deficits, the United States Rubber Company showed the best gain in sales of any major rubber manufacturer. Net profit for 1933 was $76,913 after interest and depreciation as against a net loss for 1932 of $10,358,374. Further charges and credits, not applicable to the current year's operations, caused a charge to surplus for the year of $606,338.

Net sales amounted to $88,326,666 for the year, an increase over 1932 of $10,026,575, or 12.81 per cent. Sales of tires by controlled companies are not included. Taxes were reported to have been increased by $4,183,000. The United States Rubber Plantations, Inc., reported a net profit of $79,933. Crude rubber production for the year was 48,718,000 pounds compared with 48,674,000 pounds in 1932.

Total current assets were $50,099,681 on December 31, 1933, while total current and accrued liabilities were $10,778,827. This compares with current assets of $48,228,363 and current liabilities of $15,742,559 at the end of the preceding year.

KELLY-SPRINGFIELD

REPORT of Kelly-Springfield Tire Co. for year ended December 31, 1933, shows net loss of $961,998 after taxes, interest, depreciation, etc., comparing with net loss of $666,313 in 1932.

Current assets as of December 31, 1933, including $842,452 cash amounted to $6,918,274 and current liabilities were $696,677 compared with cash of $919,624, current assets of $7,412,488 and current liabilities of $408,463 at end of preceding year.

Income account for 1933 compares as follows:

	1933	1932	1931
Gross profits	$2,691,393	$3,825,524	$5,304,579
Oper exp	3,158,474	3,590,360	4,302,245
Oper loss	$467,081	*$235,164	*$1,002,334
Other income	129,651	67,346	107,274
Loss	$337,430	*$302,510	*$1,109,608
Interest, etc.	183,126	42,296	58,603
Cr rubber loss	.....	.....	264,139
For exch loss	.....	96,982	154,282
Deprec	441,442	485,602	'78,500
Invent adj	.....	343,943	522,418
Net loss	$961,998	$666,313	$468,334

*Profit. †After depreciation.

GOODRICH

THE B. F. Goodrich Company and subsidiaries show for the year ended December 31, 1933, net profit of $2,272,514 after charges, compared with a loss of $6,582,140 in 1932. The 1933 earnings include a credit of $2,374,937 representing the difference between cost and face value of the company's bonds and debentures acquired during the year and compares with a similar credit of $2,500,957 in 1932.

Consolidated net sales were $79,293,495, compared with $74,501,804 in 1932, the increase amounting to $4,791,691, or 6.43 per cent. Total current assets on December 31, 1933, amounted to $53,322,766 and current liabilities $8,330,854.

Consolidated income account for the year 1933 compares as follows:

	1933	1932	1931
Net sales	$79,293,495	74,501,803	115,165,147
Expenses	72,439,053	72,609,326	110,894,191
Profit	$6,854,442	$1,892,477	$4,270,956
Other income	¶3,711,711	¶3,348,451	2,309,032
Total inc.	$10,566,153	$5,240,928	$6,579,988
Depreciation	4,378,572	4,799,444	5,679,366
Interest, etc	2,612,851	3,065,005	3,906,793
Federal taxes	528,000	.....	.....
For exch losses	.....	861,107	1,578,971
†Writie-down raw material, etc.	.....	1,125,807	4,426,195
Write-down of Hood Rub inv	.....	a2,011,539	.....
Prov for loss on dep in clos bks etc. (net)	693,121	.....	.....
Minority int	$81,095	‡39,834	‡204,770
Net profit	$2,272,514	a$6,582,140	a$8,806,567
Pfd divs	.....	.....	1,082,830
Com divs	.....	.....	.....
Surplus	$2,272,514	b6,582,140	b9,889,397

*Includes Miller Rubber Co. from February 17, 1930. †Write-down from cost to December 31, last, market prices of raw material on hand, on commitment and material content of unfinished and finished goods on hand. ‡Credit. ¶Debit. ¶Includes $2,374,937 profit on bonds and debentures acquired during 1933 and $2,500,957 in 1932. aWrite-down of investment in Hood Rubber Co., Inc., to book value December 31, 1932, to reflect loss on transfer of control August 30, 1932, and company's share of loss for year 1932 less profit on Hood bonds acquired by Hood Rubber Co., Inc., during the year. aLoss. bDeficit.

GOODYEAR

REPORT of Goodyear Tire & Rubber Company and subsidiaries for year ended December 31, 1933, shows net profit

(Continued on page 284)

CWA Employes Will Seek American Rubber Source

Employees of the Civil Works Administration last month joined those who have been seeking an American source for rubber. Experiments are being carried out at the United States Acclimatization Gardens at San Diego, Cal.

In a sheltered arroyo near the southern California city, CWA workers have commenced a study of such plants as the euphorbia and the huge cactus-like poinsetta in an effort to discover the long-sought native source of rubber, upon which the country may rely in case of restriction or a wartime blockade.

HEARINGS CONTINUE IN GOODYEAR-SEARS CASE

Investigations Are Carried from Akron to Cincinnati, Memphis and St. Louis—Seiberling Attacks Company Stores—O'Neil Says Pact Killed Trenton's Chance to Be Nation's Tire Capital

Developments in the Federal Trade Commission case against the Goodyear Tire & Rubber Company in connection with its contract to sell tires to Sears, Roebuck & Company centered mainly about testimony offered by heads of smaller tire companies and by independent tire dealers. Hearings were conducted in Akron, Cincinnati, Memphis and St. Louis.

F. A. Seiberling, president of the Seiberling Rubber Company, declared that price warfare with the mail order and chain store houses was destroying dealers, citing the fact that retail dealers for his own company had dropped from 4,000 in 1926 to only 1,500. He also attacked the operation of company-owned stores, mentioning the Firestone Tire & Rubber Company as the originator of this form of competition. "Firestone," he charged, "to finance this undertaking dropped in on Wall Street a few days before the great crash and sold $60,000,000 worth of securities, leaving the others holding the bag."

Speaking about the country as a whole, Mr. Seiberling said that the number of retail tire dealers has dropped from 120,000 in 1926 to 60,000 at the present time. Federal attorneys also exhibited a chart showing that there were 104 tire manufacturers in 1926 and only 30 at present.

William O'Neil, president of the General Tire & Rubber Company, also attacked the provisions of the Sears contract, terming the method of computing tire costs "unsound." At one point in his testimony he asserted that the Goodyear-Sears agreement had been successful in destroying Akron's only challenger as the rubber capital of the world by virtually putting all small tire manufacturers of Trenton, N. J., out of business. Other rubber men who testified were Charles Borland, president, Mohawk Rubber Company; J. A. MacMillan, president, Dayton Rubber Manufacturing Company, and Frank C. Millhoff, vice-president of the Master Tire & Rubber Corporation.

Dealers testified that they had been told that they were receiving the lowest prices on tires despite the evidence that Sears, Roebuck paid much lower. A. L. Palmer, former assistant manager of Goodyear's branch office at Columbus, O., stated that on a factory visit he had seen casings taken from a conveyor and indiscriminately placed in either All Weather or All State molds.

Plans Stratosphere Flight In Rubber Suit

M. E. Ridge, an American, is making plans in England for an ascent into stratosphere in an open balloon basket, clad in a sealed, flexible rubber garment, to which air or oxygen is supplied. This method is designed to save weight as against the use of a globular car or gondola and also to provide more direct contact with the atmosphere for observations.

His suit must be prevented from ballooning from lack of resistance to the outer air, the converse of the problem in a diver's suit, which is blown up by air to offset water pressure. It is reported that the suit designed for him can withstand a pressure corresponding to a height of 90,000 feet, at which altitude he believes that he will still be able to move about easily despite the inevitable ballooning of his garment.

ADAMSON MACHINE NAMES MEYER VICE-PRESIDENT

F. H. Meyer who has spent the past eleven years in sales promotion work as assistant to the president and sales manager of the American Welding & Manufacturing Company of Warren, O., has been named vice-president and general manager of the Adamson Machine Company, Akron, O.

F. H. MEYER

Mr. Meyer's past experience not only in sales work, but also in factory management and engineering work, fits him ideally for his new position.

He comes to Akron highly recommended by his many business acquaintances and friends in the rubber industry.

JANUARY CONSUMPTION 76% HIGHER THAN 1933

Consumption of crude rubber by manufacturers in the United States for the month of January (1934) amounted to 40,413 long tons, which compares with 29,087 long tons for December (1933) and represents an increase of 38.9% over December and 76.4% over January a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for January (1933) was reported to be 22,906 long tons.

Imports of crude rubber for January (1934) were 46,204 long tons, an increase of 9.8% over December (1933) and 48.5% above January 1933.

Total domestic stocks of crude rubber on hand January 31, 1934, were 368,660 long tons, which compares with December 31, 1933, stocks of 364,541 long tons. January stocks show an increase of 1.1% as compared with December, 1933, but were 4.4% below stocks of January 31, 1933.

The participants in the statistical compilation report 45,768 long tons of crude rubber afloat for the United States ports on January 31, compared with 55,606 long tons afloat on December 31, 1933, this year, and 32,539 long tons afloat on January 31, 1933.

January (1934) reclaimed rubber consumption is estimated to be 7,000 long tons, productions 9,828 long tons, stocks on hand January 31, 24,263 long tons.

SCRAP RUBBER DEALERS TO MEET IN NEW YORK

The 21st annual convention of the National Association of Waste Material Dealers, Inc., together with the annual meeting of the Scrap Rubber Institute and its other affiliates, will be held at the Hotel Astor, New York City, from March 19 to 21.

The Scrap Rubber Institute, which takes the place of the old Scrap Rubber Division of the association, will be in session throughout a part of the convention period, and its executive committee will give careful consideration to the part it must play in the selection of a code authority for the scrap rubber trade. Nat E. Berzen is president of the Scrap Rubber Institute.

Association elections will be held March 21. George Birkenstein, of S. Birkenstein & Sons, Inc., Chicago, Ill., has been nominated for president of the association, and Julius Muehlstein, of H. Muehlstein & Co., Inc., New York City, is among the candidates for members of the board of directors.

American Cyanamid to Move

The general offices of the American Cyanamid & Chemical Corporation, now at 535 Fifth Avenue, New York City, will be moved to 30 Rockefeller Plaza in that city on or about April 15. The company will use space from the 57th to the 61st floors at its new location.

GOVERNMENT REVEALS COMPANY OFFICIALS' PAY

Salary and bonus payments to officers of large corporations were made public by the Federal Trade Commission at the end of last month in connection with the hearings of the Senate Banking and Currency Committee. Those mentioned included the heads of several of the larger rubber companies.

Harvey S. Firestone, chairman, Firestone Tire & Rubber Company, was shown to have received a salary of $100,000 in 1929 and $64,800 in 1932, with no bonus in either year. Francis B. Davis, Jr., president, United States Rubber Company, was reported as receiving a salary of $102,405 and a bonus of $590 in 1929 and a salary of $107,310 and bonus of $240 in 1932.

James D. Tew, president, B. F. Goodrich Company, drew $71,250 in 1928; $75,000 in 1929; $67,062 in 1931; $60,750 in 1932 and $60,142 in 1933. Sumner Simpson, president, Raybestos-Manhattan, Inc., was paid $60,000 salary and $175 bonus in 1930; $56,000 salary and $250 bonus in 1931; $45,000 salary and $180 bonus in 1932; and $39,600 salary with no bonus in 1933.

P. W. Litchfield, president of Goodyear, was shown to have received a salary of $100,000, a bonus of $1,000 and 1,750 shares of stock in both 1928 and 1929; a salary of $96,666, a bonus of $1,000 and 2,000 shares of stock in 1930; a salary of $87,187, a bonus of $1,000 and 2,000 shares of stock in 1931; a salary of $78,787, a bonus of $1,000 and 2,000 shares of stock in 1932; and a salary of $81,000 in 1933.

Salaries paid Goodyear Tire & Rubber Company officials included C. F. Stone, vice-president, $30,000 and 800 shares of stock in 1928; Cliff Slusser, vice-president, $35,000 and 800 shares in 1928 and $36,450 in 1933; C. A. Stillman, vice-president, $24,000 and 400 shares in 1928 and $22,680 in 1933; P. E. H. Leroy, assistant treasurer in 1928, $15,000 and 301 shares of stock, and vice-president and treasurer in 1933, $25,000; R. S. Wilson, vice-president, $21,749 and 450 shares in 1928 and $29,160 in 1933.

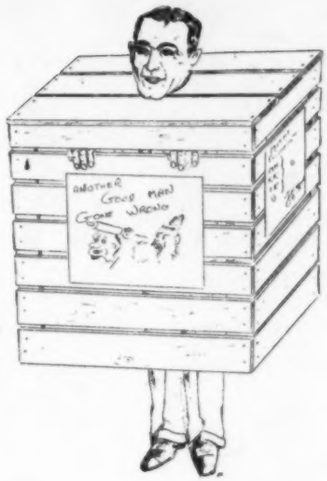
J. W. Thomas, president of Firestone Tire & Rubber Co., drew $72,500 in 1928 and 1929; $67,750 in 1930; $53,550 in 1931; $48,600 in 1932 and $53,460 in 1933.

Harvey S. Firestone, Jr., a director of Firestone, got $26,250 in 1928 and $19,245 in 1933; Stacy G. Carkhuff, secretary, drew $29,500 in 1928 and $21,384 in 1933; John J. Shea, treasurer, got $31,600 in 1928 and $23,094 in 1933; Carmen A. Myers, director, got $22,500 in 1928 and the same in 1933; B. M. Robinson, assistant secretary, drew $27,500 in 1928 and $21,384 in 1933.

D. M. Goodrich, chairman of the Goodrich board in 1928, was paid a salary of $36,000. T. G. Graham, general manager and vice-president, had a salary of $45,000 in 1928; $50,000 in 1929; $41,458 in 1931 and $24,750 in 1932.

The figures mentioned as bonus payments also include fees for directors' meetings and all additions to regular salary.

Gates Chemist Weds



The happy(?) bridegroom is Harry M. Flint, chief chemist of the Gates Rubber Co., Denver, Col., who was married to Miss Josephine Riddle on January 20, the ceremony taking place at Kansas City, Mo. On his return to his office after his honeymoon, his associates caught him and crated him up in the manner shown above while they lined up in firing squad formation, each with an egg in his right hand. The eggs didn't leave their hands, but Mr. Flint passed several uneasy moments in his helpless position and was left standing in that manner in the office lobby for some hours.

1933 TIRE PRODUCTION WAS 45,304,230 CASINGS

Shipments of pneumatic casings for the month of December amounted to 3,531,121 casings, an increase of 60.7% above November and was 94.2% above December, 1932, according to statistics released by the Rubber Manufacturers Association, Inc.

Shipments of pneumatic casings for the year 1933 amounted to 44,093,713 casings and represent an increase of 9.5% over the year 1932, but was 11.9% below the year 1931.

Production of pneumatic casings for December were 3,081,886, an increase of 1.4% above November and 55.4% above December, 1932.

Production of pneumatic casings for the year 1933 amounted to 45,304,230 casings, an increase of 13.0% above the year 1932, but was 7.0% below production 1931.

Pneumatic casings in the hands of manufacturers December 31 amounted to 8,888,070 units, a decrease of 3.9% below November 30 stocks but was 16.3% above stocks December 31, 1932.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
Nov. 1933	2,197,485	3,039,386	9,246,563
Dec. 1933	3,531,121	3,081,886	8,888,070
Dec. 1932	1,518,700	1,982,681	7,644,359

AMERICA IS ASSURED ON RESTRICTION PLAN

Consuming Countries' Interests Will Be Considered, Sir John Simon Tells Ambassador Bingham—Agreement on Restriction Is Still Held Up by Failure to Decide on Quotas

Assurance was given the United States on March 5 that Great Britain and other rubber producing countries would take into account the interests of the United States, along with other rubber consuming nations, in forthcoming conferences on plans for rubber restriction. Sir John Simon, British Foreign Secretary, was understood to have assured Robert Bingham, American Ambassador, to that effect when the latter called on him to demand that the United States be represented at any negotiations among rubber producers with a view to restriction of the world's output.

The request of the American envoy was made under the terms of the World Economic Conference agreement last year, providing that consuming as well as producing countries are to be consulted in any action regulating the production and prices of staple commodities. Sir John was understood to have replied that Britain considers herself bound by the W. E. C. agreement, and that any rubber restriction program would take into account the interests of America and other countries.

Actual negotiations between Dutch and British planting interests, meanwhile, continued but were reported to have met with the usual difficulties in allotting quotas for the various producing sections in the Far East, particularly for the Netherlands East Indies with its native growers. It is also feared that such territories as Sarawak and Siam might be able to increase their annual outputs considerably if not included in the plan now under consideration.

Last year world rubber production again outstripped consumption of the commodity by at least 30,000 tons, adding to the heavy inventories already on hand in all parts of the world. Production, according to an average of the estimates offered by several authorities, was over 843,000 tons. Consumption was figured at 803,000 tons, but another 10,000 tons should probably be added to this total in view of the higher figure shown in the Rubber Manufacturers Association quarterly report.

To Study Tire Accounting

General Johnson, NRA Administrator, announced on March 2 his approval of the Rubber Manufacturers Association, Inc., as an impartial agency for conducting a study looking toward adoption of a standard uniform system of accounting for the guidance of the rubber tire manufacturing industry.

OFFICERS RE-ELECTED BY FARREL-BIRMINGHAM

The annual stockholders' meeting of Farrel-Birmingham Company, Inc., was held at the main office of the company at Ansonia, Conn., on February 15. The following directors were re-elected: Charles F. Bliss, Henry F. Wanning, Franklin Farrel, Jr., Nelson W. Pickering, Frederick M. Drew, Jr., David R. Bowen, Carl Hitchcock, Franklin R. Hoadley, Armin G. Kessler, Walter Perry, Julius G. Day, Fernley H. Banbury, William B. Marvin, Edward H. Green, William A. Gordon, Alton A. Cheney, George C. Bryant.

Following the stockholders' meeting the Board of Directors met and re-elected the following officers: Franklin Farrel, Jr., chairman of the board of directors; Nelson W. Pickering, president; David R. Bowen, Carl Hitchcock, Franklin R. Hoadley, Armin G. Kessler, vice-presidents; Frederick M. Drew, Jr., treasurer; Laurie K. Blackman, assistant treasurer; George C. Bryant, secretary; William B. Marvin, assistant secretary.

Fire Destroys Clapp Building

Flames which spread rapidly and beyond the control of firemen destroyed the drying house and equipment of the E. H. Clapp Rubber Company at Pembroke, Mass., on February 17, with a loss estimated at $100,000. A previous plant of the company, which manufactured reclaimed rubber and molded goods, was destroyed about ten years ago, with a loss of approximately $1,000,000.

New Textile Finishing Office

The Textile-Finishing Machinery Company, Providence, R. I., has established a branch office at 919 Johnston Building, Charlotte, N. C., with H. G. Mayer and James Cook in charge. Mr. Mayer has long been the Southern agent of the company, and Mr. Cook has had long experience in the engineering and mechanical departments of plants specializing in bleaching, dyeing, printing, and finishing textile fabrics.

Bristol Forms Canadian Unit

The Bristol Company, Waterbury, Conn., in order to offer better service to the Canadian market, has incorporated the Bristol Company of Canada, Ltd., with a factory and general headquarters at 64 Princess Street, Toronto, Ont., where Bristol recording, indicating and control instruments will be made. J. S. Mayberry, for ten years with the parent company, has been appointed manager.

Thermoid to Withdraw Options

The Thermoid Co. has decided that rights to stock option under its plan for noteholders will expire on March 17, and the notes presented for stamping under the plan after that date will not be entitled to receive any such options. Legal details and listing requirements make it important that the company know exactly how many shares of stock will be required under such options.

NEW ENGLAND NEWS

Manufacturers of rubber footwear in Connecticut and Massachusetts have already begun to feel the effects of the record-breaking February snowfall in the form of substantial rush orders for goods to restock depleted wholesale and retail shelves. The tremendous demand for rubber overshoes, arctics and rubber boots has resulted in virtual exhaustion of existing stocks in Northeastern states.

Footwear plants of the United States Rubber Company in Naugatuck, Conn., began to receive "must rush" orders within four days after the "Blizzard of '34" on February 19 and 20. On the 25th and 26th, before the Northeast had been able to recover from the effects of the blizzard, a second heavy snowfall arrived, providing further stimulus.

U. S. Rubber executives pointed out, however, that the real benefit of the storms to the rubber industry would not be felt until summer, when wholesalers place their orders for fall and winter merchandise. The Naugatuck plants, as usual, have been engaged this winter principally in the manufacture of tennis shoes. Prospects for an exceptionally good summer on storm-wear production are described as bright.

The Goodyear Rubber Company, Middletown, Conn., has been experiencing a greater demand than usual for rubber footwear, of which it manufactures a full line, but the real increase is not looked for until summer, an executive told THE RUBBER AGE.

Rubber shoe manufacturers in Massachusetts and other New England states also face prospects of heavy production this summer to fill the inventory "hole" caused by the snowstorms of February and the succeeding slushy thaws of March.

Harold S. Guy, president; Charles M. Park, treasurer, and other officers of the Goodyear Rubber Company, Middletown, Conn., were re-elected at the annual meeting in February. The report issued to stockholders indicated that the company had enjoyed a satisfactory year in 1933.

Labor troubles which have occurred periodically at the plant of the Whitney-Blake Company, Hamden, manufacturers of rubber insulated wire, are expected to cease as a result of a recent conference between Martin P. Maney, member of Senator Robert Wagner's NRA Labor Committee, and Fred B. Kingsbury, secretary-treasurer and manager of the company. The difficulties experienced during recent months are said to have been due to a misunderstanding.

Carl K. Wolfe, formerly sales manager of the Norwalk Tire & Rubber Company, Norwalk, Conn., and during the past year a tire retailer, has been appointed manager of the Bridgeport, Conn., wholesale and retail branch of the Firestone Tire & Rubber Company.

TRENTON NEWS

Isaac Fineburg, 50 years old, of Trenton, for many years head of the Fineburg Auto Tire & Accessory Company, died February 10 in a Philadelphia hospital. He suffered a stroke about ten years ago and a second stroke followed early in February. Mr. Fineburg was formerly owner of the Trenton Scrap Rubber Company, being affiliated with the rubber industry for many years. Mr. Fineburg was a graduate of Rutgers University and was active in the Masonic fraternity. He is survived by two brothers and six sisters.

Edgar Whitehead, former well known Trentonian, died early in February at New Orleans. He was the son of the late Joseph Whitehead, who for many years was head of the Whitehead Brothers Rubber Company, Trenton, N. J. The younger Whitehead was for some time connected with his father's rubber concern. Mr. Whitehead was a widower. He is survived by four sons.

Clifford A. Pierce, of Glen Ridge, N. J., vice-president of the Pierce-Roberts Rubber Company, Trenton, is spending the Winter in Bermuda.

William J. B. Stokes, Trenton rubber manufacturer, who has been confined to his home for the past two months as a result of a fall, is now able to leave his bed. Mr. Stokes ruptured a blood vessel in his leg when he fell on an icy pavement.

Paul Gunkel, manager of the Joseph Stokes Rubber Company, Welland, Ontario, Canada, who has been seriously ill, will leave shortly to recuperate in Georgia in the United States.

Mr. and Mrs. Bruce Bedford, Trenton, are spending some time at Miami Beach, Florida. Mr. Bedford is president of the Luzerne Rubber Company, Trenton.

Horace T. Cook, Trenton rubber manufacturer, will spend the remainder of the winter with his family at Mountain Lake, Fla.

Names in the News

F. C. BATCHELLOR has become associated with the Vultex Corporation of America, Cambridge, Mass., producers of vulcanized latex and other latex compounds. He will be in charge of sales in the metropolitan area of New York City and northern New Jersey.

ROSCOE M. GAGE, who has been with the Fisk Rubber Company for several years in laboratory and process engineering work, has resigned to accept a similar position with the Mansfield Tire & Rubber Company, Mansfield, O.

M. F. STIGERS, of the Goodyear Tire & Rubber Company, has been named vice-president of the Cleveland Management Society. J. E. HUGHES, of the B. F. Goodrich Company, has been chosen as a director of the organization.

DR. H. L. TRUMBULL, manager of chemical research for the B. F. Goodrich Company, has been appointed as a member of a national committee of seven on legislation made by the American Institute of Chemical Engineers to survey plans now being considered in various states for licensing engineers. He represents Ohio and the Akron-Cleveland-Detroit-Indianapolis industrial district on the committee.

H. E. RYERSON, former foreign sales manager of the mechanical goods department of the United States Rubber Company, gave an illustrated lecture on rubber production and manufacture before members of the Engineering Club of the Hoover Company, North Canton, O., last month.

JULIUS FAYSASH, of the Firestone Tire & Rubber Company art department, was elected president of the Akron Society of Artists on February 16. RICHARD KRUPP, of the Goodyear Tire & Rubber Company, was named secretary-treasurer of the organization.

WILLIAM O'NEIL, president of the General Tire & Rubber Company, has been appointed as one of the 38 Ohio members of the national advisory council of the National Conference of Jews and Christians, according to an announcement by Newton D. Baker, national co-chairman of the organization.

T. G. GRAHAM, of the B. F. Goodrich Company, and R. H. MINER, of the Goodyear Tire & Rubber Company, were members of a delegation of nine Akron business men who represented the city in Washington last month in its request for funds from the Public Works Administration for several million dollars of local construction projects.

HARVEY S. FIRESTONE, SR., chairman of the Firestone Tire & Rubber Company, and Mrs. Firestone entertained JESSE H. JONES, director of the Reconstruction Finance Corporation, and Mrs. Jones, together with MRS. THOMAS A. EDISON, widow of the famous inventor, late last month at their home in Palm Beach, Fla.

RUSSELL L. COLLEY, development engineer of the B. F. Goodrich Company, addressed a recent meeting of the Akron Society of Model Engineers, illustrating his talk with motion pictures on aircraft de-icers in actual service on transport planes. He will speak on the same subject March 28 before the American Order of the Sons of St. George, at Akron.

ARTHUR D. KUNZE has resigned as assistant to the general manager of the United States Rubber Company mechanical goods department to become secretary to the Mechanical Rubber Goods Divisional

A. D. KUNZE

Code Authority and assistant secretary of the Rubber Manufacturers Association. Mr. Kunze had previously been connected with the Rubber Manufacturers Association for nine years, serving as office manager from 1920 to 1923, as assistant secretary from 1923 to 1928, and as secretary until July, 1929, when he left to join U. S. Rubber.

C. A. CARLTON, development manager of the Seiberling Rubber Company, has recently become a member of the American Society for Testing Materials.

DR. KARL ARNSTEIN, vice-president and chief engineer of the Goodyear-Zeppelin Corporation, was guest speaker February 27 at the all-engineers banquet of the Engineering College of Ohio State University.

BURTON F. STAUFFER, general manager of the Miller Rubber Products Company, Inc., and H. A. BAUMAN, general sales manager of drug sundries, were among the 30 Miller employes to whom 20-year service pins were recently awarded. Others in the group included R. T. HARPER, assistant drug sundries sales manager; GWILYM SHAW, sundries department manager; and THOMAS C. POLLOCK, manager of eastern drug sundries sales.

WARD T. VAN ORMAN, well known balloonist of the Goodyear Tire & Rubber Company, was a speaker last month before the meeting of the Ohio Engineering Society at Columbus, O.

T. A. ASPELL, general manager of the B. F. Goodrich Company's manufacturer's sales division and in charge of Goodrich aeronautic activities, has been named on a committee of 25 selected to represent the state of Ohio by the National Aeronautic Association.

V. E. ATKINS, general superintendent of the Seiberling Rubber Company, has been promoted to the post of general factory manager. He succeeds William S. Wolfe, who left the organization in January to join the Kelly-Springfield Tire Company in a similar capacity.

P. W. LITCHFIELD, president of the Goodyear Tire & Rubber Company, predicted that the country's total 1934 volume of business should be at least 10 per cent over 1933 in an article in the current *American Bankers Association Journal*.

FRANCIS R. HENDERSON, first president of the former Rubber Exchange of New York, was elected to the board of governors of the New York Tobacco Exchange, Inc., this month. Mr. Henderson recently opened an office at 25 South William Street, New York City, where he has been acting as a commodity counsel.

R. P. ROSE has been appointed managing director of all manufacturing subsidiaries of the United States Rubber Company in Europe. He will divide his time between this country and Europe, maintaining his headquarters in New York City and Paris.

H. A. BOURNE, general foreman of hose production at the B. F. Goodrich Company and chairman of the Akron Rubber Group of the American Chemical Society, has been appointed general foreman of the Goodrich tubing and channel rubber production departments.

C. R. DELONG, official of Mutuelle Solvay of America, and ROBERT ANDOYER, well-known French chemist, were visitors last month at the Akron plants of the B. F. Goodrich Company.

W. F. BLOOR, chief statistician of the Goodyear Tire & Rubber Company, and JAMES S. STEPHENS, former Goodyear industrial engineer, were among the passengers who narrowly escaped serious injury in the Pennsylvania passenger train wreck at Pittsburgh February 26, in which several were killed. Bloor lost his hat, while Stephens was shaken up and treated at a hospital.

FINANCIAL REPORTS

(Continued from page 279)

of $6,021,535 including profit of $1,887,529 on book values of foreign net current assets previously written down by charges to profit and loss, and after taxes, depreciation, interest, subsidiary dividends, etc., equal after allowing for dividend requirements on $7 first preferred stock, to 47 cents a share on 1,493,769 no-par shares of common stock. Excluding profit on foreign net current assets, the balance is equal to $5.44 a share on 759,720 no-par shares of $7 first preferred stock. In 1932 the consolidated net loss was $850,394 after inventory write-down of $6,475,327 and other deductions.

Current assets as of December 31, 1933, totaled $106,565,692 and current liabilities were $9,185,172 compared with $99,219,435 and $7,654,224 respectively, at close of 932. Cash and government securities, at cost or market, whichever was lower on December 31, last, amounted to $52,144,229 against $50,073,277.

Consolidated income account for year 1933, compares as follows:

	1933	1932	1931
Net sales	$109,655,636	109,051,757	159,199,831
Exp, taxes depr, etc	103,474,667	‡108,612,024	‡150,562,168
Balance	$6,180,969	$439,733	$8,637,663
Other inc	1,664,600	2,728,134	1,314,992
Total inc	$7,845,569	$3,167,867	$9,952,655
Int&oth chgs	3,022,447	2,996,819	3,262,528
Divs of subs etc	689,117	1,021,442	1,236,080
Profit	$4,134,006	*$850,394	$5,454,047
For exch adj	‡1,887,529	.....	†3,414,040
Res govt bd depr	.....	.....	711,384
Net profit	$6,021,535	*$850,394	$1,328,623
Pfd divs	1,516,056	5,324,794	5,395,113
Com divs	.....	.....	3,583,270
Surplus	$4,505,479	¶$6,175,188	¶$7,649,760

*Loss. †Debit. ‡Includes inventory write-down amounting to $6,475,327 in 1932 and $5,301,104 in 1931. ‡Profit on book values of foreign net current assets previously written down by charges to profit and loss. ¶Deficit.

MOHAWK

Although unit sales were the largest in its history and an operating profit of $316,488 was reported, the national recovery program, the agricultural adjustment act and federal taxes forced the Mohawk Rubber Company to take a net loss of $181,141 in 1933. For the previous year the company reported a net loss of $94,593.

Charles Borland, president, estimated the cost of NRA and AAA to the company at $425,000, of which $50,000 to $60,000 represented increased cost of labor. The balance was made up chiefly of cotton and excise taxes imposed by the AAA. He stated that tire prices must be increased 20 to 25 per cent before Mohawk can take advantage of the best spring outlook in four years and that prices eventually must go up 30 to 36 per cent to equalize the increase in production costs since last fall.

Depreciation, interest and taxes last year amounted to $184,155, cutting the operating profit to $132,333, the report showed. Federal excise and processing levies wiped out the remainder of the profit and left a net loss. Commitments for crude rubber and fabric in effect December 31 indicated a current market value in excess of cost of more than $300,000. The annual sinking fund payment of $75,000 was made, and directors were reelected for the ensuing year.

FISK

THE Fisk Rubber Corporation in its initial annual report, covering the period from May 20, 1933, when it acquired some assets of the Fisk Rubber Company, to December 31, 1933, shows net earnings of $1,279,765 after depreciation and Federal taxes. After allowing for 6 per cent dividends for the period on 39,459 shares of preferred stock, estimated as deliverable under the reorganization plan, the earnings equal $2.53 a share on the 447,356 shares of $1 par value stock estimated as deliverable under the plan. Net sales amounted to $6,422,074.

In a separate account of "export accounts in liquidation" for the period, the corporation reports net loss of $97,572 after expenses, loss on exchange and loss on sale of subsidiaries which was transferred to surplus account.

The consolidated balance sheet of Fisk Rubber Corporation and subsidiary companies as of December 31 shows total assets of $12,883,805 and total surplus of $6,930,881. Current assets, including $3,278,360 in cash and United States certificates, amounted to $8,730,228 and current liabilities totaled $781,169.

GOODYEAR (Canada)

Net profits of the Goodyear Tire and Rubber Company of Canada, Ltd., for 1933 were $1,377,476, an increase of $659,724 over 1932. After payment of dividends the total surplus at the year-end was $7,740,187, against $7,230,421 the year before. In the year bonds of the Goodyear Cotton Company of Canada, Ltd., of the part value of $582,500 were purchased and the remaining $769,000 was called for redemption in March. Working capital of the parent company was announced at $10,188,060.

CORDUROY

The Corduroy Rubber Company has reported for the year ended December 31, 1933, a net income after depreciation, federal taxes, expenses and other charges of $53,302. This compares with a net profit for 1932 of $8,070.

RAYBESTOS-MANHATTAN EARNS $685,198 IN 1933

Raybestos-Manhattan, Inc., earned net income of $685,198 in 1933, equivalent to $1.07 per share, comparing with a net loss of $457,167 during the year prior.

The balance sheet at December 31, revealed total assets amounting to $15,902,843, including $7,384,877 of current assets, equivalent to twelve times the current liabilities of $609,200 at the close of the year. The company had no banking or funded debt, or other capital obligations. The book value of its 642,900 shares of stock outstanding, after deducting the 33,112 shares held in the treasury, was $23.79 per share. The net current assets represented $10.54 per share, of which cash and marketable securities amounted to $4.11 per share.

The directors declared a dividend of 25 cents per share, payable March 15 to stockholders of record at the close of business February 28.

SEIBERLING OF CANADA TO MAKE GENERAL TIRES

Manufacture of casings and tubes for the General Tire & Rubber Company has been started in the Toronto, Ont., plant of the Seiberling Rubber Company of Canada, Ltd. The tires are being made to specifications under the supervision of General Tire engineers, this step having been taken in order to permit General to serve its Canadian customers on a basis comparable to that enjoyed by other tire makers.

The General Tyre & Rubber Company, Ltd., has been incorporated with headquarters in the Royal Bank Building, Toronto, and Vincent P. Reid is acting as Canadian sales manager. Gravel Ludger & Son, Ltd., have been appointed wholesale distributors for Montreal and district, and the company is now arranging for jobbers in all larger Canadian cities.

New General Atlas Pigments

General Atlas Carbon Company, producers of Gastex Carbon Black, has been granted trade marks by the U. S. Patent Office to cover two new carbon black pigments, CS-3 and Pelletex. "CS-3," produced from natural gas by the same process that produces Gastex, is a soft carbon black having a high color value, with a blue undertone, for use in rubber compounding, printing inks, paints, varnishes, and other kindred products. Pelletex, a dustless form of Gastex carbon black, has been developed to meet certain conditions where dust from the blacks interferes with, or seriously affects, production.

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New Rubber Goods

Red Head "Bone-Dry" Breeches

Heretofore, wherever rubberized reinforcements have been used with waterproof material in hunting breeches, the practice has been to attach these reinforcements to the inside of the breeches as a matter of expediency. The Red Head Brand Company, 925 West Chicago Avenue, Chicago, Ill., is now offering "Bone-Dry" breeches with outside reinforcement at the seat and knees. The

difficulty arising from the fact that, in the past, the rubberized material has harmfully reacted with the chemical treatment used in waterproofing the underlying material has been overcome in these new breeches. Ample ventilation is provided in these garments, which are offered in regular full length trousers, knee-lace breeches, and elastic-knee breeches.

Paintless Cover Golf Ball

After long experimentation, A. C. Spalding & Bros. have announced a paintless cover Kro-Flite golf ball which resists soiling, adds to the life of the ball and makes it more lively than before. It is said that the new ball is as perfect as the mold from which it comes. About a year ago the company had announced a paintless cover for its Top-Flite ball.

Rubber Flooring in Roll Form

New rubber flooring manufactured in roll form, simplifying the problem of floor covering for homes at reasonable cost, is announced by the Goodyear Tire & Rubber Company. This new Wingfoot flooring, placed on the market after years of development and test work, is made of rubber and compounds and is manufactured in rolls one yard wide, 25 to 30 yards in length and one-eighth inch in thickness. A fabric insert in the product precludes creeping or stretching under foot traffic. This new material presents a smooth, resilient finish, is easily kept clean, offers resistance to the ordinary staining agents and in exhaustive tests, has met the demands of varying foot traffic conditions.

Goodyear Wingfoot flooring is intended as a supplement to the rubber block tile flooring which Goodyear has been manufacturing for many years. Because the new roll type material is of lighter weight, its use on table tops and similar equipment affords a splendid field of application. It can be installed quite easily, and border strips are available in all of the eleven available colors to add to the attractiveness of the floor.

U. S. Low Pressure Tire

Prompted by the progress in motor car design, the United States Rubber Company announces a new line of lower pressure U. S. Royal tires which, according to the appraisal of engineers, reduce wind resistance, eliminate noise, and provide greater riding comfort. These new tires, first displayed in public on the 1934 Buick, have a 16-inch diameter and carry

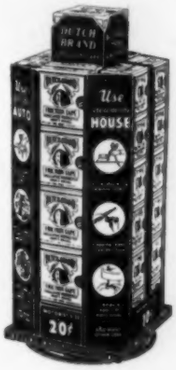
24 pounds pressure. They are strictly modern in their conception, and are not to be confused with the so-called "doughnut" tire, which is smaller and of totally different appearance. That the tires might offer less resistance to wind and that they might become virtually noiseless, engineers made the following changes in tread design and construction: reduced the number of rows in the tread and correspondingly widened the blocks and the ribs; rounded the edges of the blocks and ribs in the face design of the tread and also the edges where the sidewall and tread joins. Greater comfort, of course, is provided in the lower pressure.

Rubber Lamp Post

The city lighting engineer of Leicester, England, has been conducting successful experiments with a rubber lamp post. In a demonstration a motor truck was allowed to run into the post and pass over it several times, but each time the post righted itself and no damage was sustained by the truck.

Van Cleef Tape Dispenser

Van Cleef Bros., Chicago, manufacturers of Dutch Brand rubber and chemical products announce a new and revolutionary method of merchandising friction tape. It is a selling unit known as the Dutch Brand Friction Tape Dispenser. It consists of a beautifully lithographed revolving metal dispenser containing the 5c, 10, 20c and 35c packages of Dutch



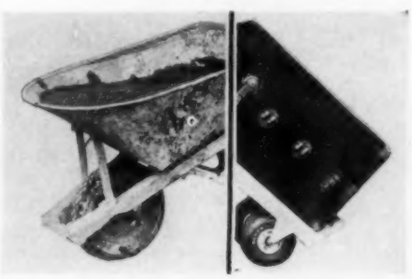
Brand Friction Tape and which takes less than a square foot of counter space. About twelve years ago Van Cleef Bros., pioneered in the merchandising of friction tape to the big consumer market and now they again pioneer by the introduction of this new tape dispenser. Dealers all over the country who now have the new tape dispenser on their counters are reported to be very enthusiastic about it. This dispenser does not replace Dutch Brand friction tape put up in display cartons.

New Goodrich Eraser

The sundries division of the B. F. Goodrich Company is introducing a new typewriter eraser with a magnetized metal holder, allowing it to stick to the body of the typewriter.

Tires for Barrows and Baggage Trucks

Continued new applications for miniature balloon tires are being located in various fields as indicated by the illustrations herewith. The one on the left shows a pneumatic tire wheel barrow



used in the construction of the new Field Building in Chicago. The cushioned Goodyear tires made it unnecessary to lay planking over tile floors. Forty pounds air pressure was maintained in these tires. The illustration at the right shows a pair of General Streamline Jumbo, Jr., tires on a baggage truck in a large railroad depot.

KLAUSS NAMED HEAD OF INDIA TIRE COMPANY

William G. Klauss took over his duties as president of the India Tire Company February 21 following the first meeting of the stockholders of the reorganized company. Other officers selected are C. T. Morledge, vice-president in charge of sales; John T. Fisher, treasurer, and Stanley Denlinger, secretary.

Directors include these officers and E. A. Campbell, president of the First National Bank in Massillon; T. E. Borton, of Borton & Borton, Inc., Cleveland brokers; Rufus W. Clark, Akron advertising counsellor; W. F. Jones, Akron automobile and radio executive; and William S. Boesche, secretary and treasurer of the Ornamental Iron Works, Akron.

The India Tire Company last month became the first rubber company to grant complete recognition to the rubberworkers' union and, therefore, authorized to use the union label on its tires. The union label will eventually be cut into its tire molds, according to Mr. Klauss.

CODE BEING COMPLETED FOR RUBBER RECLAIMERS

The code of fair practices for the rubber reclaiming industry is expected to be approved by General Johnson and President Roosevelt shortly, following hearings held in Washington on February 8 and February 27. At those hearings the Code Administrator, A. L. Kress, heard the Consumers Board and the Labor Advisory Board in addition to several representatives of the reclaiming industry. Following agreement on changes in the proposed code, it was expected the code would be ready for presentation to General Johnson early last week.

The code committee of the Rubber Reclaimers Association, Inc., which drafted the code, consisted of L. J. Plumb, chairman; J. F. McLain and E. B. Curtis. It is understood that the code covers only those concerns which manufacture reclaimed rubber for resale purposes and does not include rubber companies making reclaimed rubber for their own use exclusively.

New Jersey Zinc Earnings

The New Jersey Zinc Company reports for 1933 a net income of $3,994,072 after charges, equal to $2.03 a common share. This compares with 1932 earnings of $2,013,120, or $1.02 a share. For the quarter ended December 31, 1933, net income was $1,108,783 as against $1,514,909 in the preceding quarter and $417,790 in the last three months of 1932.

Thermoid Nets $115,718 in 1933

The Thermoid Company and subsidiaries, excluding the Southern Asbestos Company, reports net earnings of $115,718 for the year ended December 31, 1933, after all charges and federal taxes. This compares with a net loss of $199,868 during 1932.

Barr Rubber Strike Settled

A five-day strike of employes at the Barr Rubber Products Company, Sandusky, O., was quickly settled last month, with the workers returning to their posts on February 13. The employes had asked a wage scale of 40 cents an hour for women and 60 cents an hour for men, as against the company's previous average rate of 37 cents an hour and the code minimum of 30 cents an hour. The company agreed to union recognition and to adjustment of wage rates by a Department of Labor mediator.

ALCO RUBBER COMPANY TAKES GOODYEAR PLANT

The Alco Rubber Manufacturing Company of Long Island, with offices at 122 East 42nd Street, New York City, will occupy the building at Park Avenue and 131st Street, that city, about April 1. This factory was formerly occupied by the Goodyear Rubber Insulating Company.

Louis Alexander, formerly with the Industrial Rubber Company, Long Island City, is general manager of the Alco company. A general line of rubber products and items made to specifications will be manufactured.

GENERAL ATLAS CARBON COMPLETES NEW PLANT

The General Atlas Carbon Company, producers of Gastex carbon black, through Carl J. Wright, vice-president and general manager, has announced the completion of two new producing units at its Pampa, Tex., plant.

"Because of the increased demand for Gastex during 1933," continued Mr. Wright, "it was necessary for us to extend our production facilities twice during the past six months. One new unit was completed last July, and two more, which were started last November, are now being placed in operation."

Sales of Gastex during 1933 were the largest in the history of the company, being 100% more than the sales for 1932. And, with the operation of these new production units, all indications are that sales for 1934 will exceed the record made during 1933.

AKRON WATER SUPPLY DIVIDES TIRE FIRMS

Goodyear and Goodrich officials met in heated argument before the Akron City Council on March 3 over the question of the local water supply, thus publicly reopening a controversy running for a score of years over competitive water costs in the city's rubber manufacturing industry. The council opposed Goodyear's efforts by demanding exclusion of the Tuscarawas River headwaters from the $34,000,000 Muskingum valley flood control project.

Clifton C. Slusser, vice-president and factory manager of the Goodyear Tire & Rubber Company, after stating that his company has spent $4,000,000 to obtain a water supply, flatly declared that it would be necessary to move Goodyear production out of Akron unless adequate water can be had. He said that the company is already making thousands of tires that could be made at Akron at Gadsden and Los Angeles, where free water is available.

Goodyear and East Akron industries, forced to use large quantities of expensively treated city water to supplement a raw water supply from the Little Cuyahoga River, have been fighting for years to obtain a competitively low-cost supply equaling that enjoyed by South Akron and Barberton industries, which have as a source the Ohio Canal, fed from the Portage Lakes and the Tuscarawas. Companies depending on the Little Cuyahoga, besides Goodyear, are the General Tire & Rubber Company, American Hard Rubber Company, Mohawk Rubber Company and India Tire Company. Goodrich and Firestone oppose Tuscarawas water diversion.

John W. Gauthier, of the B. F. Goodrich Company, was equally emphatic in asserting, "You will never divert Tuscarawas water to the Little Cuyahoga."

Ford Gets Rubber Plants

Production on the Brazilian rubber concession of the Ford Motor Company will be increased, it is expected, with the introduction of more productive rubber plants from the East. Reports last month stated that 20,000 Singapore rubber plants had been received.

To Redeem Goodyear Bonds

The Goodyear Cotton Company of Canada, Ltd., Ste. Hyacinthe, Canada, has announced that it will redeem all of its outstanding first mortgage twenty-year 6 per cent sinking fund bonds. The bonds will be redeemed at par with a premium of 3 per cent and interest accrued to March 1 of this year.

INTERNATIONAL PULP CO., *41 Park Row, New York, N.Y.*

SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER

Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.

LIBERAL WORKING SAMPLE FURNISHED FREE

Obituaries

David A. Ducharme

David A. Ducharme, Banbury Mixer expert and service engineer of the Farrel-Birmingham Company, Inc., was one of the nine victims of the wreck of the Pennsylvania railroad train at Pittsburgh on February 26. At the time of the accident Mr. Ducharme was on his way to start in operation a Banbury Mixer at the Pennsylvania Rubber Company, Jeannette, Pa.

Mr. Ducharme was born in Troy, N. Y., February 13, 1877. In 1917 he took a position in the engineering department of the Birmingham Iron Foundry and made his residence in Ansonia, Conn., from then until 1929, when he was transferred to the Akron office of the Farrel-Birmingham Company, Inc. During his many years experience in the design and development of the Banbury Mixer he also became expert in its operation and was widely known throughout the rubber trade for his skill in starting new installations and working out problems incident to changing over from mill mixing to Banbury mixing.

Mr. Ducharme was a former Grand Knight of Valley Council, Knights of Columbus, a member of Ansonia Lodge, B.P.O.E., a member of the Holy Name Society of the Church of the Assumption and an active promoter of Boy Scout activities in Housatonic Council, all of Ansonia.

He is survived by his wife, one son and three daughters, all of Akron. Funeral services were held at Akron, Friday, March 2, with interment in Holy Cross Cemetery, Akron.

Francis H. Appleton

Captain Francis Hawkes Appleton, founder of the Appleton Rubber Company, Franklin, Mass., died at his home in that city on February 9. He was 80 years old.

It was in 1898 that Captain Appleton started a rubber reclaiming factory at Franklin and in 1902 he took in his son as a partner, the firm then being known as F. H. Appleton & Son, Inc. He served as vice-president of the Rubber Club of America in 1911 and 1912, and he was a charter member of the Rubber Reclaimers Club. When the latter body was merged into the Rubber Association, he became chairman of the Reclaimers Division of that organization.

Charles R. Flint

Charles Ranlett Flint, organizer of so many large corporations that he was called the "father of trusts," died February 12 at his apartment in Washington, D. C., at 84 years of age. He was perhaps best known as the organizer of the United States Rubber Company.

Mr. Flint visited Brazil in 1884 and organized a large rubber business on the banks of the Amazon. In 1891, he united the majority of the manufacturers of rubber boots and shoes in this country into one large concern under the title of the United States Rubber Company. He became treasurer of this corporation, which then had a capital of $40,000,000.

Mr. Flint also had a hand in the organization of such corporations as the American Woolen Company, American Chicle Company, Computing Scales Company and Sloss Sheffield Steel & Iron Company. For a time he was a member of the Council of New York University.

George Akin

George Akin, former head of the chemical research laboratory of the B. F. Goodrich Company, dropped dead in Charleston, W. Va., on February 5. He had left Akron in 1931 to join the staff of the Carbide & Carbon Chemical Company in Charleston.

Edwin Perkins Brown

Edwin Perkins Brown, chairman of the board of the United Shoe Machinery Corporation, died suddenly of angina pectoris at Boca Raton, Fla., on February 8. Mr. Brown, who was 65 years old, had gone to Florida a week previous, following several months' illness.

Mr. Brown had been associated with the United Shoe Machinery Corporation since 1899. His father, the late George W. Brown, was one of the founders of the corporation and its first treasurer and general manager, and was at the time of his death, in 1928, its vice-president.

William A. German

William A. German, sales representative of the Oak Rubber Company, Ravenna, O., died February 19 at Park West Hospital, New York City, where he underwent an operation for appendicitis three days previously. Mr. German, a resident of Cuyahoga Falls, O., had been on the staff of the Goodyear Tire & Rubber Company for 14 years and with the Sun Rubber Company, Barberton, O., before he became associated with the Oak Rubber organization.

Walter E. Tisne

Walter Emile Tisne, advertising manager of A. Schrader's Son, Inc., Brooklyn, N. Y., died in New York City on February 15. He was 57 years old and for the past 20 years had acted as an advertising executive in addition to serving as editor of Legion d'Honneur, a magazine published by the American Society of the French Legion of Honor and handling other journalistic work.

GOODRICH SAFETY PLAN ENLISTS 42,437 DRIVERS

In the first nine months of its operation, the program for safety awards to truck, bus and taxi-cab drixers carried out by the B. F. Goodrich Company, has resulted in 42,437 drivers of commercial vehicles signing the safe driving pledge and entering the race for the safety awards. These drivers represent 3245 operators of trucks, buses or taxi-cabs, either individuals or fleet operators, in every section of the country.

Hundreds of the awards have been presented to drivers who have already completed their first six months of driving without an accident for which they were responsible. Each individual driver receives a Silvertown Safety League silver medal upon completion of six months' operation of his vehicle without accident. If he operates his vehicle for a year without accident, he receives a gold medal. Each fleet having a perfect no-accident record for a year is awarded a certificate attesting this fact.

The safety award program for drivers of commercial vehicles has been given co-operation by public officials, police officials and other civic leaders fighting the menace of accidents on the highway.

Tire Advertising Medium

Talky-Tyres, made by a company of that name, is a new advertising medium. It is a device, motor operated, which fits over spare tires. Three cards automatically present themselves for reading through an opening. A. A. Henkel is president of the company, which has offices in the Wrigley Building, Chicago, Ill.

Akron Safety Rally

A safety rally for all Akron industries at the local armory on April 26 or 27 has been announced by the industrial safety committee of the Akron Chamber of Commerce, of which John Loge, of the General Tire & Rubber Company, is chairman. Governor George White of Ohio and other officials have been invited. Members of the industrial safety committee include J. T. Kidney, A. B. Crandall, R. W. Morse, C. F. Safreed, W. L. Schneider and W. C. Krisher.

Sporting Goods Exhibition

Several new rubber items were included among the displays at the Third Merchandise Exhibit of the National Sporting Goods Distributors Association which was held at the Sherman Hotel, Chicago, Ill, early last month. Exhibitors included the Bike Web Manufacturing Company, Brooks Shoe Manufacturing Company, Converse Rubber Company, Burke Golf Company, Pennsylvania Rubber Company, Seamless Rubber Company, Servus Rubber Company, A. G Spalding & Bros., Mishawaka Rubber & Woolen Manufacturing Company, Van Cleef Bros., Worthington Ball Company and L. A. Young Company.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, MARCH 10, 1934

Crude Rubber

SINCE our last report crude rubber jumped to above 11 cents on March 9, the first time this level has been reached since July 22, 1930 when it was quoted at 11⅛ cents. The average price on the outside market for February was 10.45 cents compared to 9.32 in January and 2.95 in February, 1933, which incidentally was the lowest monthly average ever recorded. While other commodities have lacked strength, rubber has continued to rise during the past month due mostly to the fact that it is believed that restriction agreement between the English and Dutch has been reached. It is stated in cables that the scheme in mind would recognize consumers' interests in the United States. Buying has largely been predicated upon favorable restriction news, even though no definite information has been made available. Quotations on the Exchange, outside market, London and Singapore follow:

Plantations—

Ribbed Smoked Sheets—			
Spot	—	@	.11 3/32
March	—	@	.11 3/32
Apr.-June	—	@	.11 1/32
First Latex, crepe spot	—	@	.13
Amber Crepe, No. 2	—	@	.09 3/16
Amber Crepe, No. 3	—	@	.09¼
Amber Crepe, No. 4	—	@	.09
Brown Crepe, clean thin	—	@	.09 3/16
Brown Crepe, rolled	—	@	.07 1/16

Latex—

Liquid Latex, per gal.	.72	@	—

Paras—

Up River, fine	—	@	.10¼
Acre Bolivian, fine	—	@	.10½

Balata—

Block, Ciudad	—	@	.31

LONDON MARKET

Standard Smoked Sheets—Buyers—March 10			
March	—	@	5 1/16d
Apr.-June	—	@	5¼d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—March 10			
March	—	@	4 3/32d
Apr.-June	—	@	4 1/16d

Reclaimed Rubber

Increasing demand for reclaims coupled with higher quotations of scrap and crude rubber, has increased quotations of all tire and tube reclaims from ¾ to 1¼ cent. Inner tubes particularly are bringing much higher prices. Demand from manufacturers is firm and continued increase in consumption of reclaims is looked for by the trade. Latest quotations follow:

High Tensile

Super-reclaim, black	.08¼	@	.08½
High Tensile Red	.07	@	.07¼

Shoe

Unwashed	.06½	@	.06¾
Washed	.08	@	.09

Tube

No. 1 (Floating)	.12	@	—
No. 2 (Compounded)	.07½	@	.07¾

Tires

Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.08	@	.08¼
Truck, Heavy Gravity	.05¼	@	.05½
Truck, Light Gravity	.05¾	@	.06

Miscellaneous

Mechanical blends	.04	@	.04¼

Scrap Rubber

Demand for most grades of scrap has increased since the beginning of the year and high prices are being obtained by dealers. Reclaimers requirements show a decided upturn, January consumption being almost 20% greater than December. Tires and tubes are in most active demand and have brought the greatest increase in quotations. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 20.00	@	21.00
Mixed auto	ton 11.50	@	12.50
Clean solid truck tires	ton 36.50	@	38.00
Boots and shoes	ton 27.00	@	30.00
Arctics, untrimmed	ton 20.00	@	22.00
Inner tubes, No. 1	lb. .05½	@	.05¾
Inner tubes, No. 2	lb. .03	@	.03½
Inner tubes, Red	lb. .02¾	@	.02⅞

Cotton

Spot cotton rose during February to an average of 12.28 cents compared to 11.25 in January. Since the beginning of this month the average has been slightly above February but trading in general has been quiet with prices fluctuating within a narrow range between 12.20 and 12.50. The trade appears to be awaiting developments on the progress of the Bankhead Bill to restrict the coming crop. The bill has been delayed and the House Committee on Agriculture and Forestry will not meet to consider it until sometime this week. In the meantime the AAA announced that 15,124,000 acres of land would be removed from cotton production by farmers, indicating a planted area of about 26,000,000 acres, the smallest for over thirty years. Quotations on the N. Y. Cotton Exchange for Middling Uplands follow:

	Feb. 9	March 10		
	Close	High	Low	Close
March	12.11	12.11	12.10	12.06*
May	12.27	12.20	12.15	12.16
July	12.44	12.33	12.27	12.28

* Nominal.

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/4/3	lb. .44½	@	—
Peeler, carded, 23/5/3	lb. .43½	@	—
Peeler, carded, 13/3/3	lb. .40½	@	—
Peeler, carded, 15/3/3	lb. .41½	@	—
Egyptian, carded, 23/5/3	lb. .52½	@	.55¼
Egyptian, combed, 23/5/3	lb. .54½	@	.56¼
CHAFERS			
Carded, American, 1 1/16"	lb. .39	@	.41
Carded, American, 1"	lb. .33½	@	.34
LENO BREAKER			
Carded, American, 1 1/16"	lb. .39	@	.41
Carded, American, 1"	lb. .33½	@	.34

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	— @	.06
40x40	36 in.	6.15	lb.	— @	.05 3/16
40x36	36 in.	6.50	lb.	— @	.05 3/16
48x48	40 in.	2.50	lb.	.11¼ @	.11½
48x48	40 in.	2.85	lb.	.09⅞ @	.10
64x68	40 in.	3.15	lb.	.10½ @	.10 5/16
56x60	40 in.	3.60	lb.	— @	.09½
48x44	40 in.	3.75	lb.	.07⅞ @	.08
44x40	40 in.	4.25	lb.	— @	.06⅞

Ducks

Enameling	lb. .31	@	.32
Belting and Hose	lb. .36	@	—
Single filling, A grade	lb. .15¾	@	.16½
Double filling	lb. .16¾	@	.17¾

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 Tons

FROM FEBRUARY 9 TO MARCH 11

Date	Spot	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Sales
Feb. 9	10.63	10.50	10.65	10.76	10.90	11.03	11.18	11.31	11.46	11.60	11.70	11.75	11.90	——	858
10	10.65	10.57	10.72	10.86	11.00	11.15	11.30	11.41	11.52	11.63	11.74	11.86	11.96	——	319
11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	10.35	10.35	10.45	10.59	10.73	10.88	11.03	11.14	11.25	11.36	11.46	11.57	11.68	——	601
14	10.32	10.32	10.37	10.53	10.69	10.82	10.95	11.07	11.19	11.30	11.40	11.50	11.60	——	552
15	10.56	10.56	10.58	10.71	10.85	11.00	11.16	11.28	11.40	11.52	11.63	11.73	11.84	——	673
16	10.69	10.67	10.72	10.86	11.00	11.15	11.30	11.43	11.56	11.66	11.76	11.85	11.98	——	619
17	10.62	10.60	10.64	10.76	10.89	11.04	11.18	11.30	11.42	11.52	11.62	11.72	11.82	——	370
18	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
19	10.37	10.37	10.40	10.54	10.68	10.81	10.96	11.07	11.20	11.31	11.44	11.57	11.69	——	345
20	10.28	10.28	10.31	10.45	10.59	10.72	10.85	10.96	11.09	11.20	11.31	11.42	11.54	——	——
21	10.41	10.41	10.43	10.56	10.70	10.85	11.00	11.12	11.24	11.34	11.44	11.54	11.64	——	310
22	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
23	10.56	10.56	10.61	10.73	10.86	11.01	11.18	11.30	11.43	11.52	11.62	11.72	11.82	——	657
24	10.50	10.46	10.48	10.62	10.78	10.92	11.08	11.19	11.32	11.39	11.53	11.65	11.75	——	219
25	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
26	10.32	——	10.27	10.41	10.56	10.71	10.87	10.97	11.08	11.20	11.31	11.43	11.54	——	505
27	10.32	——	10.26	10.41	10.56	10.70	10.85	10.96	11.07	11.18	11.28	11.38	11.48	——	591
28	10.37	——	10.33	10.46	10.62	10.74	10.91	11.02	11.16	11.26	11.37	11.48	11.59	——	348
Mar. 1	10.33	——	10.33	10.48	10.63	10.77	10.92	11.04	11.16	11.28	11.39	11.50	11.57	11.65	181
2	10.50	——	10.42	10.57	10.74	10.86	11.00	11.14	11.28	11.39	11.49	11.60	11.68	11.78	393
3	10.50	——	10.43	10.56	10.70	10.85	11.00	11.12	11.24	11.36	11.48	11.60	11.70	11.80	139
4	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
5	10.57	——	10.53	10.65	10.78	10.92	11.07	11.19	11.32	11.44	11.56	11.67	11.75	11.83	152
6	10.75	——	10.71	10.82	10.93	11.07	11.22	11.33	11.44	11.55	11.65	11.75	11.86	11.97	527
7	10.78	——	10.79	10.87	10.95	11.09	11.23	11.36	11.49	11.60	11.70	11.80	11.90	12.00	600
8	10.93	——	10.90	10.99	11.08	11.23	11.38	11.50	11.63	11.73	11.83	11.93	12.05	12.15	379
9	11.12	——	11.02	11.11	11.22	11.34	11.49	11.61	11.75	11.86	11.96	12.07	12.18	12.28	760
10	11.20	——	11.18	11.24	11.32	11.46	11.63	11.74	11.87	11.97	12.06	12.15	12.25	12.35	596
11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——

Rubber CHEMICAL Markets

NEW YORK, March 12, 1934

ACCELERATORS

Organic			
A-1	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.		
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.46 @	.47
Diphenylguanidine	lb.	.36 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsol X	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
R-2 Base	lb.	4.55 @	5.00
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.20 @	.23
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06¾ @	—
Magnesia, calcined, heavy	cwt.	4.00 @	4.50

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.06 @	.10
Browns			
Sienna, Italian	lb.	.04 @	.08
Umber, Turkey	lb.	.04 @	.06
Greens			
Chrome, light	lb.	.23 @	.26
medium	lb.	.26 @	.28
dark	lb.	.28 @	.33
Chromium Oxide, bbl.	lb.	.23 @	.27
Reds			
Antimony			
crimson, 15/7	lb.	.45 @	—
sulfur, free	lb.	.48 @	.52
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone, Albalith	lb.	.04½ @	.04¾
Lithopone, Azolith	lb.	.04½ @	.04¾
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX Zinc Sulphide, bbls.	lb.	.11 @	.11¾
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05¾ @	.06
ZZ (leaded)	lb.	.05½ @	.05¾
Horsehead Lead Free Brand:			
Selected	lb.	.05¾ @	.06
Special	lb.	.05¾ @	.06
XX Red	lb.	.05¾ @	.06
XX	lb.	.05¾ @	.06
XX Green	lb.	.05¾ @	.06
Leaded Brand, Standard	lb.	.05½ @	.05¾
Sterling	lb.	.05½ @	.05¾
Superior	lb.	.05½ @	.05¾
Lehigh	lb.	.05¼ @	.05½
U. S. P., bbls.	lb.	— @	.12¾
Kadox, black label	lb.	.09⅜ @	.09⅝
Blue label	lb.	.08⅜ @	.08⅝
Red label	lb.	.07 @	.07¼
St. Joe, black label	lb.	.05¾ @	.06
green label	lb.	.05¾ @	.06
red label	lb.	.05¾ @	.06
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.05¾ @	.06
Anaconda, selected lead free	lb.	.06¼ @	.06½
Florence White seal, bbls.	lb.	— @	.10⅝
Green seal	lb.	.09⅜ @	.09⅝
Red seal	lb.	.08⅜ @	.08⅝
Yellows			
Chrome	lb.	.16 @	.16½
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.06 @	.08
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	—
Barium carbonate (98-100%)	ton	56.50	@61.50
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	10.00	@18.00
Western prime white	ton	23.00 @	—
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00	@75.00
Carrara filler	lb.	.01¾ @	.02
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00	@75.00
heavy	ton	45.00	@55.00
Clay, Kaolin, domestic	ton	7.50	@15.00
Aerfloted, Suprex	ton	7.50	@10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00	@22.00
Par	ton		
Tensulite		15.00 @	—
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.15 @	.22
medium white	lb.	.12 @	.14
Kalite No. 1	ton	30.00	@55.00
Kalite No. 3	ton	40.00	@65.00
Magnesia, carbonate	lb.	.06 @	.06¾
Mica	lb.	.04 @	—
Rottonstone (powdered)	ton	23.50	@28.00
Soapstone, powdered	ton	16.00	@18.00
Starch, powdered	cwt.	2.50 @	2.60
Talc, domestic	ton	12.00	@15.00
Pyrax A	ton		
Whiting, commercial	cwt.	.85 @	1.10
English cliffstone	cwt.	1.50 @	1.70
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.10½ @	—
Zinc Stearate	lb.	.23 @	—

MINERAL RUBBER

Genasco (factory)	ton	30.00	@32.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Parmr, solid	ton	23.00	@28.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.55 @	1.80
Tartaric, crystals	lb.	.23½ @	—
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12
Alkalies			
Caustic Soda, 76%	cwt.	3.66 @	—
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	— @	.06¾
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.04⅝ @	—
Niger	lb.	.02¾ @	.03
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02½ @	—
Pigmentaroil	gal.	.13 @	.18
Pine, steam distilled	gal.	.59 @	.61
destructively distilled	gal.	.56 @	.58
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07½ @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 290 lb.	bbl.	5.50 @	—
Pigmentar	gal.	.13 @	.18
Tar Retort, 50 gal.	bbl.	9.50	@10.00
Solvents			
Acetone, pure	lb.	.10 @	—
Alcohol, denatured, No. 1 bbls.	gal.	.30½ @	.41½
Benzol, 90%	gal.	— @	.27
Carbon, bisulfide	lb.	.05 @	.06
Carbon, tetrachloride	lb.	.05¼ @	.06
Dichlorethylene	lb.	.29 @	—
Dipentene	gal.	.31 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.55 @	—
wood	gal.	.50 @	—
destructively distilled	gal.	.45 @	—
Waxes			
Beeswax, white	lb.	.30 @	.32
Carnauba	lb.	.25 @	.26
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.05 @	.06
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	.03½
White crude scale 124/126	lb.	.02 @	.02½
Refined, 125/127, 138/140	lb.	.03 @	.07

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-A and Flectol-B	lb.	.54 @	.62
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.52 @	.65
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Dipex	lb.	.06 @	.08
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Zip	lb.	— @	—

SUBSTITUTES

Amberex	lb.	.13¾ @	—
Black	lb.	.06 @	.08
White	lb.	.07½ @	.12
Brown	lb.	.06½ @	.11

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½ @	.04
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags)	cwt.	1.75 @	2.10
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1932:							
Jan.	33,221	3,387,505	4.55	1,524	185,466	5.43	31,697
Feb.	27,959	2,690,250	4.29	1,915	222,584	5.19	26,044
Mar.	45,197	4,251,801	4.19	2,227	240,128	4.84	42,970
April	37,903	3,181,343	3.74	2,128	196,934	4.53	35,775
May	34,182	2,798,914	3.71	1,505	144,561	4.30	32,677
June	40,808	2,647,085	2.89	1,981	134,336	3.02	39,136
July	32,306	2,102,915	2.91	2,030	179,699	3.95	30,276
August	33,449	2,027,045	2.71	1,339	128,952	4.29	32,110
Sept.	28,956	1,774,403	2.73	2,388	241,960	4.54	26,568
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,677
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,638	2,261,869	5,989	944,895	11,083	1,833,671
1933:								
Jan.	—	—	33	7,815	357	40,586	841	100,900
Feb.	—	—	12	2,923	391	52,171	367	46,037
Mar.	—	—	45	11,963	437	56,262	539	55,731
April	—	—	7	2,054	210	26,856	794	80,794
May	—	—	35	9,869	463	55,560	734	71,008
June	—	—	759	1,514,296	466	61,229	604	66,827
July	—	—	238	76,141	638	79,049	618	85,636
Aug.	—	—	272	527,147	390	55,509	1,156	196,138
Sept.	—	—	65	30,738	761	149,296	1,343	267,516
Oct.	—	—	119	47,663	542	99,249	1,561	310,531
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	.....
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	.....
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	26,226	.....
May	34,592	37,333	49,233	39,386	37,817	30,957	44,580	.....
June	33,801	37,676	43,227	34,195	37,916	41,475	51,326	.....
July	29,219	37,407	41,526	29,508	31,397	29,976	50,184	.....
Aug.	33,460	42,927	38,274	30,850	27,586	23,721	44,939	.....
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,686	.....
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,906	.....
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	29,162	.....
Dec.	25,492	31,232	25,531	21,687	21,409	18,015	29,087	.....
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	405,689	.....

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1933:									
Jan.	5,301	4,811	21.0	16,262	July	12,049	10,317	20.6	14,108
Feb.	4,578	4,363	20.2	16,570	Aug.	11,708	9,446	21.0	15,037
Mar.	3,847	3,454	19.1	15,496	Sept.	10,435	7,862	22.0	15,869
Apr.	4,617	4,407	16.8	14,370	Oct.	9,466	7,212	22.6	17,748
May	8,366	7,770	17.4	13,734	Nov.	9,063	6,335	21.7	19,170
June	10,591	9,674	18.8	13,231	Dec.	9,539	5,951	20.3	20,746
1934:									
Jan.	9,828	7,000	17.3	24,263	July	....	....	...	....
Feb.	....	....	...	....	Aug.	....	....	...	....
Mar.	....	....	...	...	Sept.	....	....	...	....
Apr.	....	....	...	....	Oct.	....	....	...	....
May	....	....	...	....	Nov.	....	....	...	....
June	....	....	...	....	Dec.	....	....	...	....

* Stocks on hand at the end of month or year.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933	1934		1932	1933	1934
January	26,038	26,510	29,519	August	35,706	37,426	.....
February ...	25,378	23,312	.....	September ..	33,828	34,303	.....
March	29,597	28,227	.....	October	32,680	32,973	.....
April	31,234	30,176	.....	November ..	29,895	30,262	.....
May	32,016	33,999	.....	December ..	27,110	28,787	.....
June	39,489	37,710	.....				
July	30,929	34,458	.....	Total	373,900	378,143	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
January	—	—	—	4 1/16	4 1/16	4 5/16	4 5/16	4 3/16	4 3/16	—	4 5/16	4 5/16	4 3/16	4 3/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 3/16	4 3/16	4 5/16	3	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	—	—	4 5/16
February	4 3/16	4 3/16	—	4 1/16	4 1/16	4 5/16	4 5/16	4 3/16	4 3/16	—	4 5/16	4 5/16	4 3/16	4 3/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 3/16	4 3/16	4 5/16	3	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	4 5/16	—	4 5/16
March	3 1/16	3 1/16	—	3 1/16	3 1/16	—	3 5/16	3 5/16	3 5/16	4	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16	4	4	4	4	3 5/16	3 5/16	3 5/16	4	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16	3 5/16
April	3	3	—	3	3	3	2 7/8	3	3	—	3	3	3	3	3	3	—	3	3	3	3	3	3	—	3	3	3	3	3	3	3	3
May	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/4	4 3/16	3 1/16	3 1/16	—	3 1/16	3 1/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16
June	2 15/16	2 15/16	—	2 15/16	2 15/16	3 1/4	4 3/16	2 15/16	2 15/16	—	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16
July	2 15/16	2 15/16	—	2 15/16	2 15/16	3 1/4	4 3/16	2 15/16	2 15/16	—	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16	2 15/16
August	3 1/16	3 1/16	—	3 1/16	3 1/16	3 5/16	4 3/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
September	4 1/16	4 1/16	—	3 15/16	3 15/16	4 1/16	4 3/16	4 1/16	4 1/16	—	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16
October	3 1/16	3 1/16	—	3 1/16	3 1/16	3 5/16	3 5/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
November	3 1/16	3 1/16	—	3 1/16	3 1/16	3 5/16	3 5/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
December	3 5/16	3 5/16	—	—	—	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16
1933																																
January	—	—	—	3 1/16	3 1/16	—	2 11/16	—	3 1/16	—	3 1/16	3 1/16	3 5/16	3 1/16	—	2 11/16	3 1/16	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	3	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	2 11/16	3
February	2 11/16	2 11/16	—	2 11/16	3	—	2 11/16	2 11/16	—	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3
March	3	3	—	2 15/16	3 1/16	—	3 1/16	3 1/16	—	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
April	2 15/16	2 15/16	—	3	3	3 1/16	2 11/16	3 1/16	3	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
May	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
June	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
July	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
August	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
September	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
October	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
November	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
December	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	—	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16
1934																																
January	—	—	9	8 11/16	9	9	10 5/16	10 3/16	10 3/16	—	11 1/16	11 1/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	—	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16	10 15/16
February	9 7/16	9 7/16	10 1/2	—	10 1/16	10 1/16	10 3/4	10 3/4	10 3/4	—	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	—	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16
March	10 1/16	10 1/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1927

Month	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	40.25	20.14	15.24	8.34	4.38	3.08	9.32
Feb.	32.75	23.97	15.85	7.70	4.03	2.95	10.45
Mar.	26.82	24.55	15.34	7.71	3.35	3.01	....
Apr.	18.97	21.18	14.93	6.43	3.02	3.56	....
May	18.99	21.46	14.24	6.49	3.09	4.95	....
June	19.59	20.64	12.45	6.35	2.66	6.15	....
July	19.40	21.30	11.24	6.37	2.89	8.01	....
Aug.	19.46	20.59	9.96	5.38	3.63	7.31	....
Sept.	18.47	20.37	8.28	5.08	3.84	7.30	....
Oct.	18.83	19.67	8.20	4.87	3.65	7.64	....
Nov.	18.26	16.62	9.01	4.65	3.44	8.66	....
Dec.	17.97	16.12	9.05	4.64	3.24	8.87	....
Average for Year	22.48	20.55	11.98	6.17	3.49	5.96	....

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Dec.	Jan.	Feb.	Mar.	Day	Dec.	Jan.	Feb.	Mar.
1	4 1/2	—	4 1/2	4 1/2	17	—	4 3/8	4 1/2	
2	4 1/2	4 3/8	4 1/2	4 1/2	18	4 3/8	4 1/2	—	
3	—	4 1/4	4 1/4	4 1/2	19	4 3/8	4 1/2	4 1/2	
4	4 1/2	4 3/8	—	—	20	4 1/8	4 1/2	4 1/2	
5	4 1/4	4 1/4	4 1/2	5	21	4 3/8	—	4 1/8	
6	4 1/8	9 3/8	4 1/2	5 1/16	22	4 1/8	4 1/2	4 1/2	
7	4 3/8	—	4 1/2	5 1/16	23	—	4 1/2	5	
8	4 3/8	4 3/8	4 1/2	5 1/16	24	—	4 1/2	5	
9	4 3/8	4 3/8	5	5 1/16	25	—	4 5/8	—	
10	—	4 1/4	5 1/16	5 1/16	26	—	4 1/2	4 1/2	
11	4 3/8	4 1/4	—	—	27	4 1/8	4 1/2	4 1/2	
12	4 3/8	4 3/8	4 7/16		28	4 3/8	—	4 1/16	
13	4 3/8	4 3/8	4 1/2		29	4 1/8	4 1/2	—	
14	4 3/8	—	4 1/2		30	—	4 1/2	—	
15	4 3/8	4 3/8	4 1/2		31	—	4 1/2	—	
16	4 3/8	4 1/4	4 1/2						

Average Monthly Price Per Pound

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Jan.	4.160	3.052	2.264	4.429
Feb.	3.823	2.760	2.093	4.920
Mar.	3.822	2.047	2.099	
Apr.	3.082	1.876	2.323	
May	3.035	1.825	2.966	
June ..	3.082	1.750	3.392	
July	3.048	1.875	3.860	

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Aug	3.385	2.654	3.811	
Sept. ..	2.524	2.485	3.728	
Oct.	2.898	2.425	3.957	
Nov. ..	2.890	2.518	4.096	
Dec. ..	3.115	2.444	4.200	
Average for Year	3.155	2.434	3.233	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.
1	—	11.75	12.20	11	11.10	—	—	21	—	12.40	
2	10.50	11.80	12.50	12	11.05	—		22	11.50	—	
3	10.45	11.95	12.40	13	11.25	12.45		23	11.50	12.40	
4	10.65	—	—	14	—	12.40		24	11.45	12.40	
5	10.55	11.95	12.45	15	11.65	12.45		25	11.45	—	
6	10.75	12.15	12.35	16	11.60	12.55		26	11.35	12.10	
7	—	12.25	12.30	17	11.55	12.55		27	11.50	12.15	
8	10.85	12.45	12.45	18	11.50	—		28	—	12.15	
9	10.95	12.55	12.40	19	11.65	12.40		29	11.70	—	
10	11.05	12.65	12.35	20	11.60	12.30		30	11.70	—	
								31	11.75	—	

Average Monthly Price Per Pound

	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	10.27	6.65	6.23	11.25
Feb.	10.96	6.85	6.05	12.28
Mar.	10.90	6.86	6.39	
Apr.	10.19	6.16	7.02	
May	9.38	5.72	8.64	
June	9.05	5.02	9.47	
July	9.28	5.87	10.76	

	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Aug.	7.21	7.43	9.55	
Sept.	6.52	6.30	9.64	
Oct.	6.32	6.30	9.58	
Nov.	6.44	6.22	10.04	
Dec.	6.25	6.00	10.17	
Average for Year	8.56	6.41	8.63	

* Exchanges closed due to Bank Moratorium.

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794		51,728	32,898		370,604	414,692	
Mar.	329,586	390,135		44,190	29,531		373,776	419,666	
Apr.	336,957	382,167		40,387	30,745		377,344	412,912	
May	336,719	364,623		50,453	43,342		387,172	407,965	
June	334,657	333,954		43,079	63,608		377,736	397,562	
July	333,729	326,609		37,894	57,435		371,623	384,044	
Aug.	342,888	325,148		42,846	53,084		385,734	378,232	
Sept.	346,154	334,637		46,188	57,255		342,342	391,892	
Oct.	358,282	343,579		40,176	58,568		398,458	402,147	
Nov.	360,386	353,852		40,879	57,140		401,265	410,992	
Dec.	379,000	364,541		38,360	55,606		417,360	419,147	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	
Feb.	65,942	37,182		Aug.	47,079	39,480	
Mar.	64,280	40,845		Sept.	44,942	39,237	
Apr.	61,848	40,911		Oct.	42,327	37,101	
May	56,089	41,998		Nov.	40,606	36,139	
June	51,009	43,032		Dec.	37,407	35,615	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1933					
September	39,472	39,257	39,191	39,292	39,221
October	38,935	38,565	38,457	37,898	
November	37,170	36,831	36,443	36,360	
December	36,165	35,853	35,970	35,643	35,777
1934					
January	36,478	37,326	38,333	38,537	
February	39,064	39,509	40,133	39,775	
March	39,680				

Stocks in Liverpool

1933					
September	57,266	57,213	56,826	56,625	56,164
October	54,899	54,134	53,500	52,969	
November	52,818	52,910	52,466	52,418	
December	51,894	51,803	51,954	51,206	51,014
1934					
January	51,434	51,897	52,256	52,037	
February	51,937	52,615	52,920	52,944	
March	52,832				

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	
Feb.	49,283	46,954	21,530		Aug.	48,971	20,649	38,601	
Mar.	49,590	46,591	24,594		Sept.	47,025	20,415	36,948	
Apr.	45,868	39,663	25,460		Oct.	52,132	23,158	37,282	
May	44,278	38,690	29,822		Nov.	46,947	25,419	39,018	
June	47,517	19,770	34,676		Dec.	45,795	25,341	38,269	

STOCKS IN OTHER CENTRES

End of:	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Jan., 1933	38,844	25,080	2,143	4,662	5,676
Feb.	37,323	28,540	2,033	4,210	6,006
Mar.	33,494	26,180	2,183	3,779	5,780
Apr.	33,391	27,710	2,214	3,428	5,204
May	32,613	24,090	1,534	3,177	4,790
June	35,919	22,930	1,147	2,913	4,321
July	35,020	22,900	1,007	3,208	3,830
Aug.	36,756	22,900	1,033	3,411	3,588
Sept.	36,083	22,000	1,107	4,286	3,288
Oct.	37,302	25,900	1,411	4,889	3,237
Nov.	36,965	28,320	1,285	5,575	3,383
Dec.	38,441	28,000	1,052	5,792	2,981
Jan., 1934	.....	.....	.....	.....	.....

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	.....
1927	19,700,003	1931	11,253,800	1935	.....
1934:		1934:		1934:	
January	789,274	May	.....	September	.....
February	1,262,311	June	.....	October	.....
March	.....	July	.....	November	.....
April	.....	August	.....	December	.....

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory [2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
Jan.	3,675	3,462	2,258	3,744	3,253	2,597	8,957	7,912	7,237
Feb.	3,985	3,871	2,339	3,402	2,553	2,292	9,536	9,172	7,377
Mar.	4,663	3,671	2,038	4,122	2,954	2,092	10,014	9,878	7,290
Apr.	4,944	3,517	3,123	4,932	3,698	3,654	10,031	9,846	6,778
May	5,679	3,820	5,189	5,415	4,258	5,180	10,312	9,379	6,760
June	5,672	5,643	6,100	5,572	10,065	6,305	10,447	4,999	6,615
July	4,926	3,617	5,714	5,462	2,404	5,497	9,919	6,203	6,844
Aug.	3,906	3,089	4,994	4,960	2,655	4,707	8,896	6,659	7,070
Sept.	3,172	2,539	3,999	3,932	3,082	3,503	8,158	6,096	7,595
Oct.	2,974	2,569	3,429	2,852	1,799	2,537	8,300	6,876	8,462
Nov.	2,500	2,304	3,039	2,887	1,711	2,197	7,919	7,454	9,247
Dec.	2,643	1,983	3,082	2,781	1,819	3,531	7,775	7,644	8,888

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory [2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
Jan.	3,623	3,308	2,093	4,062	3,529	2,535	9,439	7,719	6,197
Feb.	3,916	3,281	2,224	3,400	2,728	2,102	9,921	8,760	6,357
Mar.	4,450	3,502	1,883	3,789	2,686	1,902	10,475	9,448	6,369
Apr.	4,617	3,225	2,853	4,636	3,385	3,051	10,413	9,441	6,189
May	5,413	3,409	4,700	5,281	3,867	4,463	10,459	8,913	6,382
June	5,358	5,279	5,448	5,397	9,019	5,778	10,504	5,174	6,097
July	4,955	2,937	5,603	5,831	2,160	5,211	9,589	5,975	6,440
Aug.	4,435	2,748	4,916	5,301	2,503	4,687	8,774	6,127	6,628
Sept.	3,449	2,601	3,827	4,150	3,098	3,472	8,095	5,753	7,008
Oct.	3,077	2,187	3,506	2,813	1,658	2,676	8,321	6,214	7,831
Nov.	2,443	2,005	2,863	2,594	1,578	2,103	8,119	6,662	8,625
Dec.	2,597	1,779	2,631	2,767	1,724	3,410	7,922	6,749	7,815

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete beginning with 1929, and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,959,945	1,606,703	353,242	65,924	53,855	12,069	2,025,869
1933*							
Jan.	130,087	108,326	21,761	3,358	2,921	437	133,445
Feb.	106,888	91,492	15,396	3,298	3,025	273	110,186
Mar.	118,002	99,885	18,117	6,632	5,927	705	124,634
Apr.	180,713	153,350	27,363	8,255	6,957	1,298	188,968
May	218,347	184,698	33,649	9,396	8,024	1,372	227,743
June	253,387	211,483	41,904	7,323	6,005	1,318	260,710
July	233,141	195,023	38,118	6,540	5,322	1,218	239,681
Aug.	236,556	195,144	41,412	6,079	4,919	1,160	242,635
Sept.	196,143	160,900	35,243	5,808	4,358	1,450	201,951
Oct.	138,542	108,073	30,469	3,682	2,723	959	142,224
Nov.	63,987	44,429	19,558	2,291	1,503	786	66,278
Dec.	84,152	53,900	30,252	3,262	2,171	1,091	87,414
1934							
Jan.	161,006	116,277	44,729	6,904	4,946	1,958	167,910

* 1933 figures revised.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [5]						
	Gross Exports	Gross Exports Minus Imports		India & Burma [2]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1932:															
Aug.	39,327	7,371	31,956	4,717	129	506	400	300	4,803	4,882	7,244	1,086	303	49	56,377
Sept.	41,973	8,869	33,104	5,238	122	614	400	340	3,858	6,485	7,664	1,621	318	78	59,733
Oct.	37,931	9,798	28,133	2,945	139	583	350	428	4,022	7,051	8,944	1,147	414	247	54,403
Nov.	40,098	10,072	30,026	4,146	185	683	350	371	4,368	6,250	9,080	805	1,164	156	57,588
Dec.	40,118	10,089	30,029	5,801	367	644	350	406	4,683	7,066	8,594	1,211	824	150*	59,493
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	125*	58,887
Feb.	37,564	6,167	31,397	5,064	304	541	458	368	4,895	5,119	6,081	895	620	125*	55,867
Mar.	42,059	7,964	34,095	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	125*	61,501
Apr.	36,752	7,758	28,994	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	125*	56,435
May	42,902	13,664	29,238	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	125*	66,078
June	41,411	16,538	24,873	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	125*	63,794
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	125*	73,942
Aug.	52,266	17,869	34,397	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	125*	74,746
Sept.	49,607	15,146	34,461	5,111	125	1,027	728	611	5,868	9,164	15,005	1,702	656	125*	74,452
Oct.	61,002	17,390	43,612	5,674	271	959	750*	979	6,329	8,682	15,170	1,513	965	125*	84,879
Nov.	54,599	20,142	34,457	6,097	516	1,020	750*	1,191	6,684	9,951	14,474	1,599	956	125*	77,820
Dec.	57,579	18,110	39,469	7,062	964	989	750*	1,046	7,030	10,183	17,274	2,173	930	125*	87,995
1934:															
Jan.	55,276	21,184	34,092	7,551	.....	1,197	750*	1,290	6,513	8,974	17,718	2,158	.....	125*	.....
Feb.	57,963	19,688	38,275	8,354											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,176	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,496	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1932:															
Oct.	34,748	2,927	4,715	4,177	1,207	5,653	510	1,853	569	627	553	537	489	986	59,551
Nov.	27,689	4,950	3,830	3,577	1,593	4,563	1,265	1,481	1,653	1,035	275	489	631	650	53,681
Dec.	31,246	1,182	3,205	4,623	941	5,603	2,103	3,720	745	1,298	348	544	485	2,602	57,645
1933:															
Jan.	29,260	3,277	5,858	4,241	1,189	7,611	3,005	1,558	1,275	1,388	308	640	252	838	60,700
Feb.	22,970	7,102	6,603	4,460	1,175	8,508	994	2,820	2,001	1,670	375	564	132	681	60,055
Mar.	27,348	8,883	6,093	4,425	1,114	6,035	1,604	2,088	1,904	952	282	649	340	688	62,405
Apr.	20,236	7,765	6,308	4,805	555	5,495	2,215	2,274	1,580	882	163	606	281	400	53,565
May	24,894	11,085	4,144	4,622	1,704	5,289	1,278	1,691	425	710	—525	536	433	432	56,718
June	22,228	8,739	4,056	3,639	1,441	3,330	1,997	2,000	613	469	—519	772	541	400	49,706
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,282
Aug.	43,208	4,330	5,254	4,193	1,795	4,426	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,84.	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,085	604	1,118	310	777	44.	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	....	190	1,360	213	703	.....	1,772	.....
1934:															
Jan.	47,114	9,503													

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

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